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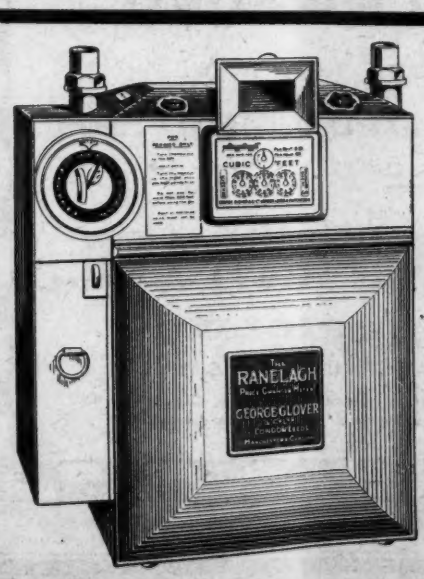

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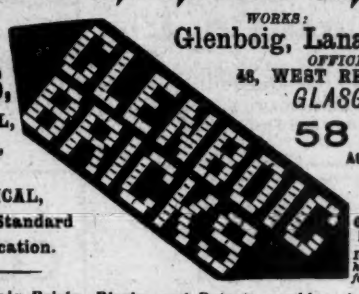

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CONTENTS.

EDITORIAL NOTES.

The Political Upheaval 219
Should an Inquiry be Held 219
The Advance of Carbonizing Practices . . 220
Public Service and the "B.C.G.A." . . . 221
Therms and Gas Accounts—An Inopportune Time?—B.Th.U. Consumptions—Pre-Briquetting and Free-Burning Coke—Inerts in Coal 222
Oil Borings—Gas Coal Position—Coal Miners and a Subsidy—Gas Coal Exports—Gas Coke Shipments—Comparative Prices for Exported Coal—Bunker Coal and Fuel Oil 223

Personal. 223
Obituary—James Randall 223
A Pamphlet on "The Therm". 224
Electricity Supply Memoranda 224
Local Taxation in Scotland—Effect on Gas Undertakings. By J. W. Napier . . . 226
Conversion Tables 226
Podmore Dust Proof Lamps 226
Design and Construction of a 12½-Million Gasholder. By R. J. Milbourne, Assoc. M.Inst.C.E., F.C.S. 227
The British Commercial Gas Association—Eleventh Annual Conference at Bristol—Light and Life. Lecture by Sir Henry Gauvain, M.D., M.Ch., M.R.C.S., L.R.C.P. 230
The Business Meeting 231
Presidential Address of Alderman Sir George E. Davies, J.P. 231
Midland Junior Gas Association—Presidential Address of Mr. C. F. W. Rendle 234
Eastern Counties Gas Managers' Association—General Business 237
Gas-Works Reconstruction at Norwich.—Synopsis of a Lecture by Mr. Thomas Glover 240
Woodall-Duckham Installation at Warrington 244

MISCELLANEOUS NEWS.

Gas Regulation Act Applications 246
Gas Regulation Act Orders 246
London County Council and the Therm Basis—Suggestion to Ask for an Inquiry Agreed to 246

MISCELLANEOUS NEWS—(*continued*).

Culross and the Early History of Gas. . . 247
Current Sales of Gas Products 248
Stock Market Report 249
Trade Notes 250

PARAGRAPHS.

Midland Association Gas Engineers and Managers 225
Institution of Structural Engineers—London and Southern District Junior Gas Association—Southern Association of Gas Engineers—Scottish Junior Gas Association (Western District) 226
Manufacture of Hydrogen 229
Ventilation and Atmosphere 245
Southampton Gas Light Company—Fatal Gas Escape—Irish Gas Prices—Tamworth Gas Light and Coke Company. 247
Price Again Reduced at Walton-on-Thames—Gas or Electricity for School Lighting—Streets in Darkness—Cheaper Gas at Harwich—Kilkenny Gas-Works—Bradford and the Tong Overseers—Cirencester Gas Company, Ltd.—Gas-Meter (Fees) Order, 1922 24
Oswaldtwistle Gas Managership 250

For List of "JOURNAL" Advertisers see p. 251.

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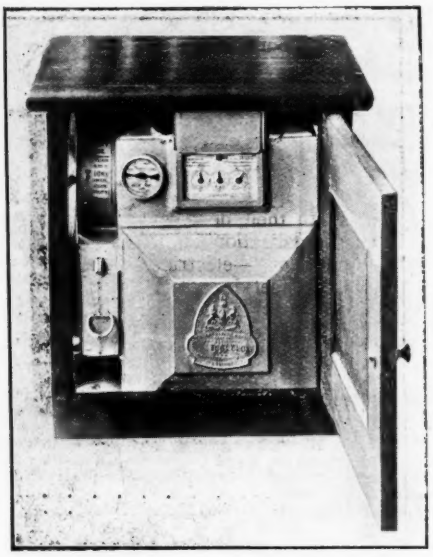

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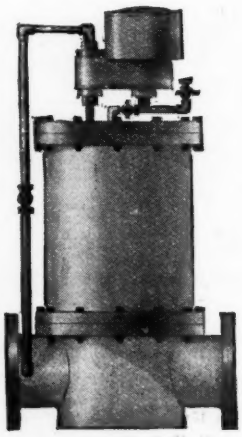

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VOL. CLX., No. 3102.] WEDNESDAY, OCTOBER 25, 1922. [74TH YEAR.

EDITORIAL NOTES.

The Political Upheaval.

THE gas industry having an important place in the country's system, it is deeply concerned in all political movements and changes that will in any way affect its interests. The Coalition Government has had its long existence ended in a dramatic manner; and the party system is now being re-established. There is to be a General Election; and while the political chaos and uncertainty continues, every industry will more or less feel the effects. Meanwhile Mr. Bonar Law is the new Prime Minister; and Mr. Lloyd George has slipped back into a free political life, and this from a condition of things in which policy has been largely governed by the expediency of the hour, rather than by permanent interests. As a technical and industrial journal, we are politically neutral. Our only concern in political questions is when the interests of the gas industry are in any way involved, and then it is our duty to be for or against, according to circumstances.

It may, however, be admitted without affecting our neutrality that during the régime of the Coalition Government much beneficent work has been accomplished—in fact, more possibly than could have been done under the party system, seeing that the times demanded that party differences should be sunk, and that all should pull together in view of the unparalleled stress. But it must be confessed that under the Coalition Government there has also been a good deal of experimental domestic legislation which has had no justification. We should at once except from this the Gas Regulation Act, which really had birth in the Fuel Research Board—Parliament more or less only confirming what that competent body recommended. There were, however, several other far-reaching matters and legislative decisions. Under the "reconstruction" investigations and schemes, the issues of which were to create a new heaven upon earth, there were the housing projects, which resulted in costly houses which will never fetch the rent to pay the interest upon, and to liquidate, the money spent, let alone provide for upkeep. Then there is the reorganization of the electricity supply industry on the generating side, which is destined to separate production from trading, and to constitute special joint authorities to undertake the generating work. There is a sharp division of opinion in the electricity supply industry as to whether any greater good will come out of this than by allowing the existing company and municipal undertakings to develop along natural lines. It cannot be asserted that what is being done in this respect is being received with any marked enthusiasm either by the electricity supply industry, or by manufacturers whom the scheme is intended (so highly flexible imaginations supposed) primarily to benefit. They have grave doubts upon the subject. And as ratepayers they are not a little concerned over the introduction of a piece of financial degeneration which is altogether bad—that is, the lending by local authorities of money which they themselves have borrowed to authorities over whose proceedings they have no complete control, with the local rates pledged as security for the money and interest. Then, during the time of the Coalition Government, there has been the vast trouble and two stoppages in the mining industry, with the introduction of the seven-hour day, which has permanently raised the producing cost of the first necessity of all the industries of the country. Now the Labour Party is very active in the preliminaries to secure a larger controlling interest in the government of the country; and in their domestic programme they place foremost the nationalization of land, mines, and "other essential public services"—electric power especially. Gas is an "essential" public service; so the gas industry may take it that it is included in the ambitious programme.

Among the political events of the past week was the election by a sweeping majority, as the member for Newport (Mon.), of Mr. Reginald Clarry, son of Mr. George Clarry, of Cardiff. We congratulate him, but at the same time sympathize with him on having to face almost immediately a General Election. The new member was formerly gas engineer at Swansea; and his knowledge of gas affairs will be, if fortunately he retains the seat, an asset to the gas industry in the House of Commons.

Should an Inquiry be Held.

IT will be observed that there is not a note of interrogation after the above heading. If there were, the answer would be that it is not within the province of the gas industry or of the petitioners to decide whether or not there shall be an inquiry into the therm and high gas accounts question, but solely within the determination of the Board of Trade. The therm has been charged with misdemeanour, in that it has been the cause of high gas accounts. The gas industry does not particularly want an inquiry, because the answer to the charge is a simple and satisfactory one, and yet a great deal of trouble and expenditure of time would be involved. Nevertheless, if the powers that be yield to pressure over the matter, then the gas industry will willingly do its part in clearing-up misapprehensions. Pressure is being applied. The London County Council have accepted the recommendation of the Public Control Committee that the Board of Trade shall be approached with an application for an inquiry into the methods of charging by the therm; so that the matter is now definitely in the balance, and awaits the decision as to whether or not an inquiry shall be held.

Should there be an inquiry, what is the nature of the case the gas industry would have to meet? The complaint that high gas accounts were caused by the therm largely applies to the quarter ending with June. Why the therm selected the June quarter for playing-up pranks more worthy of a playful spook than a sedate physical quantity, is not explained. However, the London County Council are asking for an investigation into the method of charging by the therm, which method is a decree of Parliament, and cannot be altered by any exploring tribunal, but only by Parliament itself. Any inquiry of the kind would have, among other points, to take into account the fact that, with the reduction in the price of the therm, the accounts of gas consumers are quarter by quarter slipping downwards in comparison with the corresponding periods of the previous year, even ignoring the fact that consumption was generally smaller last year. So from that point of view the method of charging is quite a sensible and legitimate one. In fact, the consensus of competent opinion is that the therm is a more exact, and therefore more comparable, basis for gas charges than the cubic foot; and therefore, this being admitted, there can be no rational argument for the retention of an inferior basis. The therm being right, then charging by the therm must be right. However, this by the way. We asked the question, what is the case the gas industry has to meet? It is that the gas accounts for June were higher than they were in the corresponding quarter of last year; and this is attributable to the operation and ill-behaviour of the therm. But unless it can be shown that gas accounts were universally higher under the working of the therm, then the therm as an operative

cause for higher gas accounts can be well left out of the question.

Then some of the letters complaining of higher gas accounts have spoken of consumption increases up to 100 and even 200 p.ct. upon the June quarter of last year. These are appalling percentages. Supposing the 100 p.ct. were true, what would this mean for (say) the Gas Light and Coke Company? Simply that they would have had to make approximately double the volume of gas that they did in 1921, and distribute it. And this, not being the age of miracles, they could not do. Therefore those high accounts are not representative of the whole. Supposing the therm system had been in operation throughout 1921, instead of nine months, and the therm was guilty of sending the accounts up by 100 p.ct., the quantity of gas sold by the Company, instead of being 30,382,532,000 c.ft. for the year, should have been more like 60,765,064,000 c.ft.; and we undertake to say the Company have not the manufacturing and distributing capacity for meeting such a sudden flight in demand. As a fact, in 1921 there was (we see from the published accounts) a decrease in the sale of gas by 5 p.ct.; and be it marked the therm system was in operation for nine months of the year! In the June quarter of this year, we believe that an increase in consumption of something like 7½ p.ct. upon the (reduced) consumption of the June quarter of 1921 will be found about correct. Since the end of June this year, the average temperature night and day has been 7° lower than in the corresponding period of last year, and the June quarter of last year was very hot. Small wonder then there was an increase in consumption this year; and yet the percentage increase over the whole of the consumers is so small, which is a proof that high gas accounts are exceptions, and not the rule. The gas industry has a good answer to its traducers and to those who complain; and this answer, constituted not of assumptions, but of facts that cannot be refuted—will be given at the inquiry, should one be held. To condemn the therm as a potent cause of high gas accounts, one must show that the therm has consistently during its operation produced high accounts (making allowance, of course, for additions to price due to the coal stoppage); but in face of the decrease during the therm period of 1921 and the smallness of the average increase this year over and above the decrease of 1921, the proof is clear that there has not been any consistent and general advance in gas accounts other than that attributable to the differences in the conditions prevailing in the two periods.

The gas industry must not relinquish the therm (even if Parliament would consent to abrogate it), because of the liberties it confers through the Gas Regulation Act, which liberties will be a powerful aid to the industry's technical and commercial evolution. We are confident that, if an inquiry is held, facts will be adduced that will show there has been false accusation against the therm. It is, indeed, pitiable to see the absence of the most elementary knowledge regarding this subject on the part of writers in newspapers, who have sought to destroy the new system on information supplied by individual accounts, but (as we have shown) without possible application to the accounts generally. Not with any idea of evading a public investigation, we ask the London County Council with all seriousness: Where is the substance in the case which they will have to present, if they appear as representatives of those who have complained? We fail to find it. The real substance is in the answer that can be, and (if the need comes) will be, made to the allegations. Incidentally, it is interesting to note that to-day the bulk of town gas in this country is being sold at percentage increases upon pre-war charges that are below the official percentage increase of the current cost of living.

The gas industry does not want to give up the therm, for several good and sufficient reasons—reasons technical and commercial—which, in view of a possible inquiry, we will not deal with here. On the contrary, it is to be hoped that the result of an inquiry (if held) will be the extension of the application of the therm system, so as to get the industry on to a common basis, as is the plain intention of the Gas Regulation Act. If, however, consumers prefer the cubic-foot system to the therm, or do not want to indulge in a little and simple calculation in order to check their therm accounts, it is so easy for every undertaking—for a time at any rate—to render their accounts showing both cubic feet and therms. We have received an account from the Gas Light and Coke Company, which gives our office consumption both in therms and cubic feet, and the prices per therm and per 1000 c.ft. The account tells the recipient plainly that "1000 c.ft. of this Company's gas equal 5 therms." Then the lines—

GAS supplied to date of Index Taking, as per Meter Card			
@	per therm (or	per 1000 cubic feet):	
	Cubic Feet.	Therms.	
192 :	00 equals		. . . .

Such a statement should fully satisfy all consumers, whether their preference is for cubic feet or for therms. Then in time, as the therm system becomes better appreciated, it will be quite easy to drop the cubic feet.

We have spoken of the help in its technical and commercial progress that the therm system is, and will be increasingly, to the gas industry; but the security that the consumers get under the system is immeasurably more than they ever had previously. That security was one of the chief points in the report of the Board of Fuel Research; and the security was ensured by Parliament in the Gas Regulation Act. Should an inquiry be held, this point will have to be borne in mind by the tribunal; and it is a point that may be commended to the Board of Trade in considering their permissive powers to make the therm system universal through the statutorily controlled gas supply of the country. Section 1 of the Gas Regulation Act should become a commonly applied law. It aims at constancy of supply and a single basis of charge for the same quantity of heat, which means better co-ordination. Those aims are in the interests alike of gas undertakings and consumers.

The Advance of Carbonizing Practices.

No one will question the statement that Mr. Thomas Glover, of Norwich, is a good all-round gas engineer; but if there is one thing more than another in which he has shown a marked bent in his professional career, it is the study of the science and art of coal carbonization, with the view to obtain the best results in gas and secondary products, combining both quantity and quality. He has always—carbonization being the basic stage in the work and business of a gas undertaking—devoted much attention to the examination of practices, theoretically and experimentally, with the view of finding that critical stage in any particular line of working which, with a given grade of coal, will give the maximum return. Coal carbonization, he holds, is not something which can be pursued by any rule-of-thumb method, to ensure the best and most profitable result. He is right. Coal is a precious raw material, and more so to-day than it was before the war, when it could be delivered on gas-works at less than half the price that is being paid to-day. Therefore, both economy and efficiency, as well as common sense, plead for its treatment in a scientific manner; and if this can be accomplished by plant that can be adapted to practically any set of circumstances, so much the better. Knowing the views of Mr. Glover, the members of the Eastern Counties Gas Managers' Association anticipated that, at their meeting in Norwich last Thursday, they would have presented to them something of high technical interest, in the lecture which Mr. Glover had promised to deliver, describing the reconstruction of the gas-works in that city. They were not disappointed. They were also aware from old experience, that, when the decision was made to meet in Norwich, the Chairman (Mr. Henry Woodall) and the Directors of the British Gas Light Company would desire to extend a hearty welcome to the Association. That Company, their acts have shown, have always deemed it to be a duty, as well as a pleasure, to take, whenever opportunity offers, an encouraging and helpful part in the work of our technical and commercial organizations. This was again worthily attested last Thursday.

It has been known for some time past that large extensions and reorganizations have been proceeding at the Company's Norwich works. Business success and prospects made this imperative. The central feature of all that has been done is the new Glover-West carbonizing plant. And a fine installation it is. It was, however, the scheme as a whole that was the subject of Mr. Glover's lecture, which was profusely illustrated by lantern slides. Upon the scheme (it was learned from Mr. Woodall, at the last meeting of the proprietors of the Company) the round sum of £250,000 would have been spent from first to last. But part of the scheme is extension work; part is reconstruction. Therefore much of the cost is chargeable to revenue, and

the capital is increased by some £100,000. But it is all money well spent, because of the realized higher efficiency and economy. Looking at the complete lecture, there was no section of it, regarded from the engineering and managerial points of view, that was so interesting and instructive as that which illustrated, from the Norwich experiences and practices, the large strides that have been effected in carbonization processes in the last twenty years. In 1903-4, when the last scheme of reconstruction was carried out, the manufacturing capacity of the works was more than doubled, on practically the same site. This showed a magnificent advance over the pre-existing plant. The new retorts were horizontal ones, and later in connection with them the De Brouwer charger and discharger was installed. We well remember many of the details of that reorganization scheme, which saw the removal of the purification and distribution section to one site, and the utilization of the other for manufacturing purposes only. The conditions were full of difficulties; and they required an engineer of vision and robust conception. Mr. Glover, with his staff, was equal to the imposing task; and what was then accomplished has been the means of serving both the citizens and the Company well. Heavier charges and longer carbonization periods in horizontal retorts became the vogue; and Mr. Glover was soon a strong advocate of these. With the then new plant and changed practices, he has been able to realize 70 therms per ton from good Yorkshire coal; a high quality coke has been made; a larger production of excellent liquid hydrocarbons has been secured; and all this with reduced formation of naphthalene, sulphur compounds, and hydrocyanic acid. The gas so made, too, carries sufficient natural lubricant to prevent "undue" corrosion of mains, services, and meters. Moreover, by means of sensitive governors and careful adjustment, the benefits of reduced pressure in the retorts have been realized, with less loss through leaky retort mouthpieces and doors, and at the same time inerts have been kept down to about 12 p.ct.

There one had advance in plant, process, and results of a no mean order. But given the best of plant, it will fall away from any attained high efficiency if there is not constant and proper supervision with a view to maintenance. And the facts at Norwich in respect of day-by-day realization tell of that regular control which pays—and handsomely. However, for all that, Mr. Glover knew this was not the ultimate goal along the lines of retort carbonization, with bye-product recovery. More could be done by the prevention of destructive cracking of the gaseous hydrocarbons; and, while he does not speak categorically, he says this "appears" to be possible in continuous vertical retorts with steaming, and the formation of limited quantities of water gas. Mr. Glover is cautious until he has had personal experience with his new installation; but when he goes so far as to refer to what "appears" to be possible, we may be pretty confident that he is satisfied his view will materialize. But that is not all. We know well of the economies and flexibility of continuous vertical retorts, of the large degree of heat control that can be realized by them compatible with throughput and quality of coal, and with the degree of steaming. Again, with land so precious as it is at Norwich, a further striking point in Mr. Glover's lecture was that now on the same site, with just a little additional piece of land, the continuous verticals have enabled another scheme to be carried out which provides for a doubling of the manufacturing capacity—that is to say, the scheme provides for 2½ to 3 million c.ft. per day, with an additional 1½ million c.ft. of carburetted water-gas plant. The vertical retort house for the make mentioned occupies an area of 7520 sq. ft., as compared with 15,060 sq.ft. for the horizontal retort house, with the retorts in five tiers, for a make of 2 million c.ft. In other words, although having an extra capacity in output, the new vertical retort installation only requires one-half the superficial area.

So progress has been made in every direction in carbonizing practice—progress that means economy and higher efficiency, quantitative and qualitative. The other new plant, and its arrangement, with reasons for adoption, were also explained by Mr. Glover. Those who were present, and represented the technical side of the industry's work, were instructed not only by the lecture, but by a visit to the works themselves. There were hearty acknowledgments of the engineering skill displayed in dealing with a difficult situation; and both the Company and Mr. Glover were complimented on the new works, and the substantial progress of the gas supply of the city. At the same time, the manner in which the contractors had carried out their work was fitly recognized—not only by Mr. Glover, but by the visitors.

Public Service and the "B.C.G.A."

MANY annual meetings of the British Commercial Gas Association are within our personal recollection; but though others may have equalled it in many respects, there has never been, pressing the whole of the proceedings into a single view, one which has excelled that held at Bristol last week. It was a triumph of organization; it was a triumph in its diversity of interest and enjoyment; and we are confident that it will be so in its beneficial effects. On such occasions as this, a great deal of the quality of the result depends on environment and atmosphere. And when, as on this occasion, the civic authorities, represented primarily by the Lord Mayor (Alderman E. H. Cook, D.Sc.), and an imposing gas company like that at Bristol, represented by the Chairman (Mr. J. H. Howell), welcome an Association with the warmth and courtesy, and in the case of the Company with right good hospitality, such as was experienced last week, the effect upon the proceedings is good. It makes all the difference to the prevailing spirit. It was so at Bristol. The one idea seemed to be to give and take—to give as much useful information as possible, and to glean full measure from the wealth of accumulated experiences. The meetings are really symbolical of the work of the Association itself. The Association set out, and has continued, on the lines of being of service both to the industry and to the public at large. Those are the lines of the annual meetings. Views and experiences are useful and encouraging to the men attending them; but a reasonable proportion of the material brought before the conferences is intended for the edification of the public. The organizers succeed in this. They—helped by the President (Sir George E. Davies), the brilliant lecturer (Sir Henry Gauvain), and the authors of the papers—succeeded abundantly to this end on the present occasion; and so their work in this respect had its reward.

The lecture that Sir Henry Gauvain gave on that fascinating subject "Life and Light" was a fitting prelude to the masterly Presidential Address of Sir George Davies, in which he in foremost place dilated on the "public service" of the gas industry and of its men. Every administrator, every official, and every employee of a gas undertaking who can do anything to advance the business of the concern is doing a public service. And be it remembered that the business will not progress if the conditions that are favourable to advance are not present. One cannot force consumption. Consumers use gas of their own free will. They will not employ it liberally in the place of any other lighting, heating, or power agent, unless they are satisfied by a result which proves it is worth while to do so. A large part of the work of the Association is directed to the propagation of the gospel of gas service; and vast as has been the development of the industry, the field for such propaganda does not become less, but actually expands—not so much through the enlargement of population, but through fresh knowledge of applications, and through invention, a strong stimulating influence in which is that pressing mother—necessity. We cannot afford, as in the old days, to wait upon invention. We welcome it when it comes unexpectedly. But when out for expansion, as the Association and all who co-operate in its work are, then, when a new place is seen in which, or a new application is found for which, gas can be used, then the means of application have to be devised; and following this comes the quest for raising efficiency in the new application. The industry was never more active than to-day in its work; and in a not inconsiderable measure this activity is kept up to high-water mark by the diligence and earnestness with which the Executive and their Chairman (Mr. F. W. Goodenough) and all the members of the staff of the Association pursue their part in the great campaign, as confidently entrusted to them by the subscribers to the funds. At the confluence of the stream of co-operative effort with the stream of local effort, we find that great activity of which we have been speaking, and that wide public service of which Sir George spoke so eloquently and so truly in his address.

In the gas industry public service connotes much. It comprehends many features in useful and far-reaching effort. It is not covered by the valuable work of educating the public to use gas economically, and to that end employing

the most efficient appliances and methods. That work is valuable to the consumers themselves; and though a narrow-minded section of the public may not see this, it is one of the most satisfactory ways of advancing the gas business and the general interests of the industry. The Association take part in that work in avenues of influence, and in many other directions. Its policy is broad, and is ever being extended or remoulded to the day and the opportunity. But, as the President indicated, the public service of the gas industry does not stop at educational work that results in economy in respect of the gas account, and in higher efficiency in respect of the work performed. The service of gas undertakings minimizes labour in the home; and it is one of the best and most accommodating servants that the poorer section of the community ever had. It is a fuel and a power agent that is unrivalled in industry. As a fuel its value is high in reducing labour, in promoting works output, and in securing uniformity of product. Rightly handled, work can be done with it with mechanical precision. As a power agent for long-hour running, it has an unmatched economy. In hotels, boarding-houses, hospitals, schools, and other public institutions, its services are of a value exceeding greatly its cost as a fuel. If we may single-out from the excellent papers read at the meeting one for special mention, it would be that of Mr. P. G. G. Moon, for from actual accounts he quotes consumptions and costs for large service in this connection. What does all this public service bring in its train? The answer is something that is the greatest public service of all—a cleaner atmosphere, an atmosphere more penetrable by the sun's rays; and this, without taking into account the attendant salutary conditions in the home and factory, is a condition of things that makes life more pleasant by the promotion of health.

To be associated with an industry that renders such multifarious public service, is, as the President points out, something in which we can all take pride. Such association imposes a duty and responsibility upon each one to do his utmost—whether it be by working for lower prices (which help to enlarge business, and so tend to improve the capability for reaching still lower prices), or in the other directions already referred to—to render public service within the limits of his (cannot we say?) unique opportunities. One of those ways is by genuine support of the work of the "B.C.G.A." The fact that such a large proportion of the gas supply contributes to the revenue for the magnificent operations of the Association is a declaration of a great unanimity of competent opinion as to the value and potency of the co-operative work. And this good work goes on not only among those who are the customers of to-day, but among those who are the householders of to-morrow—thus ensuring, so far as human ingenuity can, a new custom which will come as a natural order of things.

Therms and Gas Accounts.

The South Metropolitan Gas Company have proved beyond dispute that the therm system has not made any appreciable difference to the gas consumers in comparison with two quarters of 1920 before the therm system came into operation, excepting during the quarters that, through external circumstances, the price had to go up by 1d. to 11½d. per therm, and then the average of the accounts does not support the complaints as to excessive totals which have appeared in letters in the newspapers. Sir William Plender has investigated the books of the Company, and vouches for the accuracy of the statistics he presents. He has divided the accounts up between (1) public users, (2) large business accounts, (3) industrial users, and (4) private consumers and small business accounts, and has ascertained the average payments of each class of consumer in the Lady-Day quarters and the Midsummer quarters of 1920 (before the therm system was introduced), and 1921 and 1922 under the therm system. Taking only the fourth class of custom, in the Lady-Day quarter of 1920, with gas at 4s. 8d. per 1000 c.ft., the average charge per consumer was £3 11s. 10d.; in the same quarter of 1921, the figure, at 10½d. per therm, worked out to £3 13s. 7d.; and in 1922, with the charge at 11½d. per therm, it was £4 5s. 7d. In the Midsummer quarter, with the same charges, the average in 1920 was £2 6s. 3d.; in 1921, £2 7s. 3d.; and in 1922, £2 13s. 9d. The figures (making allowance for the 1d. per therm increase to recoup the extra costs of the coal stoppage) prove that such increase as there was in the consumers' bills was not due to the therm system.

An Inopportune Time?

Writing in the "Journal of the Society of Chemical Industry" on the therm system of charging, Sir William Pope shows himself a whole-hearted believer in it as a distinct advance. But he is inclined to think that the gas undertakings made a most unfortunate choice of the time at which to institute the change—the price of gas having so soon to be increased. Perhaps Sir William is not an investor in the gas industry. If he is, he would have known of those several lean dividend years which the stock and share holders suffered under the sliding-scale, and of how the market values of their stocks had from 50 to 60 p.ct. knocked off them. He would also have known how impossible it was for gas undertakings to raise, under those conditions, much-needed new capital without paying exorbitantly for it. There was really no choice as to when the therm system should be started. The introduction of the system was statutorily combined with financial rehabilitation; and there was nothing to be done but to get relief as quickly as possible. In Sir William's opinion, it will be an advantage when consumers can read their meters directly in therms; but meanwhile he strongly urges that accounts should be rendered in both therms and cubic feet. This is already being done by some undertakings. While in his view it is of the greatest importance that the progress made by the Fuel Research Board in establishing the sale of gas upon a heat basis should not be prejudiced by extraneous factors, he thinks it highly desirable that the Board of Trade should call for an inquiry for the purpose of defining the nature of those factors which have arisen fortuitously, but "which undoubtedly operate against the popularity of a distinct advance—that, namely, of securing by legislative action the merchanting of gas on the basis, not of bulk, but of its usefulness to the consumer."

B.Th.U. Consumptions.

It is very noticeable that authors of papers dealing with subjects at the gas-trading end have not yet acquired the habit of quoting consumptions in B.Th.U., or therms, as is most convenient. The cubic foot still holds sway in this respect, which is a pity. Better quote both, if there is still a preference for cubic feet. Some of the papers at the "B.C.G.A." meeting exemplify the retention of the latter, and neglect of the heat-unit basis.

Pre-Briquetting and Free-Burning Coke.

This subject is again brought to mind by the publication of the reply of Mr. E. R. Sutcliffe to the discussion on the paper which he and Mr. E. C. Evans read at a meeting of the South Wales Institute of Engineers [see "JOURNAL" for Aug. 9]. It will be remembered that the question was raised as to whether a free-burning coke could not be made without the briquetting of the coal to be carbonized. It can; but it is held by Mr. Sutcliffe that briquetting serves to give the coal such a form as to render it commercially useful. It is, in fact, submitted that it is extremely difficult to make a free-burning fuel in existing gas-retorts and coke-ovens without briquetting. Messrs. Sutcliffe and Evans contend that the combustibility of a coke is due to the fine porosity of its walls, which fine porosity can only be satisfactorily produced by previous fine grinding, and thorough intermixture of the coal and coke breeze used; and, due to the fine grinding, briquetting is necessary in order to enable a satisfactory coke to be made. The mere fact of briquetting does not improve combustibility. All that briquetting attempts to effect is to put the material into such a condition that it will come out of the retorts or ovens as a dense, hard coke. As to the cleanliness of gas coke, the authors assert that no gas company in this country are as yet washing their coal, inasmuch as they object to putting between 10 and 20 p.ct. of water into the retorts. The authors' object is to give them a clean, dry material which can be dealt with in their existing plants. This would naturally result in a cleaner coke. It is claimed that, under the authors' treatment, a wider range of coals can be used.

Inerts in Coal.

It is becoming more and more general for gas undertakings entering into contracts for coal to specify the maximum percentage of ash that the coal must contain. The economy of doing this in respect of carbonizing space is obvious; the effect upon the quality of the coke, and therefore the works' own fuel and

labour account, is something that makes it worth while insisting upon a limitation of inerts in coal. No time could be better than the present for being insistent in this particular matter.

Oil Borings.

It may be taken as perfectly proved now that there are no oil-bearing strata in this country that make it worth while proceeding further with exploration to ascertain whether it can be made self-supporting in the matter of natural oil. The contractors who were at one time busily engaged in sinking wells have, during the past year, been actively engaged in recovering casing from the wells, and plugging those that have already proved unsuccessful. The only well that has continued production is that at Hardstoft. There a fairly considerable accumulation of petroleum appears to exist; but the measure of this can only be ascertained by further and more extensive drilling. At present, the natural flow of oil at this well is only at the rate of about 3 tons per week.

Gas Coal Position.

The colliery owners in Durham and Northumberland are adopting a somewhat firmer attitude; and prices of gas coal have been put up from a few pence to about a shilling per ton. Continental buying shows no relaxation; and some new contracts have been entered into, at from 30s. to 31s. per ton for best sorts, with 2s. 6d. off the bottom price for secondary varieties. Generally, in other areas, greater activity is reported; and those undertakings that have delayed booking-up their orders are finding that the collieries have an inclination for better prices. It is notable how consistently in all fields the best classes of gas coal are being bought.

Coal Miners and a Subsidy.

When the representatives of the Miners' Federation visited Mr. Lloyd George the other day, to lay before him their case for financial assistance for the miners, they were greeted with the statement: "I am no longer Prime Minister, and so I cannot promise you anything." The Secretary of the Federation (Mr. Frank Hodges) has since been instructed by his Committee to ask the new Prime Minister to receive a deputation as soon as possible on the question of the miners' wage position.

Gas Coal Exports.

The exporters of coal of all sorts are making a bold bid for the total recovery of the overseas markets; and they have now got well along the road in trying to obtain the 1913 peak. In September no less than 7,082,729 tons (the highest monthly figure for the year) were sent out of the country, as compared with 1,475,623 tons in September, 1920, and 3,406,579 in September, 1921. The value of the 7,082,729 tons shipped last month was £8,110,083. In the nine months to September, 45,476,573 tons were exported, compared with 19,851,555 tons in the corresponding period of 1920, and 13,351,554 tons in 1921. Gas coal is showing a bumper demand from abroad. In September, no less than 1,267,824 tons were exported to overseas gas undertakings, compared with 98,925 tons in 1920, and 413,475 tons in 1921. The value of the quantity exported last month was £1,405,596, or a fraction of a penny over £1 2s. 2d. per ton. In the nine months, the quantity of gas coal shipped was 6,725,032 tons, as against 1,587,122 tons in the same period of 1920, and 2,138,983 tons in 1921. The value of the gas coal shipped in the past nine months is put at £7,389,032.

Gas Coke Shipments.

The exports of gas coke are bounding upwards. The amount that left these shores last month was 111,546 tons, with a value attached of £152,711, or an average of £1 7s. 4·56d. per ton. The export of gas coke in September, 1920, was 74,133 tons, and in September, 1921, 31,032 tons. In the past nine months, 585,758 tons were shipped (value £840,875); in the same period of 1920 632,226 tons (value £3,859,934); and in 1921, 270,945 tons (value £644,363). The figures for 1920 are worth studying in comparison with those now ruling.

Comparative Prices for Exported Coal.

The "Iron and Coal Trades Review" has been making a detailed examination of the coal export trade position; and among the interesting figures are the relative average monthly f.o.b. prices for the nine months to September, 1913, 1920, 1921, and 1922. We will not reproduce them all, but will take the figures for the month of September of each year as being fairly representative. In September, 1913, the average price was 13s. 10d. per ton; in 1920, £4 9s. 8d.; in 1921, £1 10s. 6d.; in 1922, £1 2s. 10d. Our contemporary points out that one unfortunate aspect of the export coal trade is that its present volume is only possible because of the reduced home industrial demand. There will be a considerable shrinkage in the export business when industry in this country reaches its normal level.

Bunker Coal and Fuel Oil.

Another interesting feature of the investigation is the monthly shipments of coal and fuel oil during the nine months. It is a feature the miners must not overlook, as it appears that fuel oil during this year will displace for bunker purposes over 800,000 tons of coal. Our contemporary's figures show that during the past nine months bunker coal shipments have amounted to 13,566,110 tons; fuel oil shipped as bunkers has been 99,465,422 gallons; and this fuel oil rendered in terms of coal displaced represents 616,680 tons.

PERSONAL.

Both on account of personal friendship and because of his intimate knowledge of the needs and working of the gas industry, readers of the "JOURNAL" will have rejoiced at the election last Wednesday as Member of Parliament for Newport (Mon.) of Mr. REGINALD G. CLARRY, son of Mr. George Clarry, Secretary and General Manager of the Cardiff Gas Company. Mr. Clarry, who fought a stiff contest as an Independent Conservative, with Liberal and Labour opponents, won by 2090 votes over the Labour candidate, on a heavy poll. While his victory has been so notable, it is regrettable to see that the political crisis which arose simultaneously presages an early general election.

Mr. H. A. AITKEN, who has been appointed General Manager of the Leven and Wemyss Gas-Works, was educated at Montrose, and started his career with the Montrose Gas Company. In 1908 he was appointed Assistant Manager. In 1911 he became Chief Assistant at the Kirkcaldy Corporation Gas-Works, and in 1914 he transferred to Motherwell. After demobilization he became Works Manager at Longton, Stoke-on-Trent.

The Council of the British Cast-Iron Research Association, whose headquarters are at Birmingham, and who work in co-operation with the Government Department of Scientific and Industrial Research, have offered the post of Director of Research to the Association to Dr. PERCY LONGMUIR, of Sheffield, who has accepted the position. Dr. Longmuir is a well-known Sheffield metallurgist, and has had a life-long experience in research work in connection with the cast-iron industry.

A handsome cutlery cabinet and an after-dinner liqueur and coffee table cabinet were presented last Friday to Mr. H. TALBOT (General Manager to the Welsbach Light Company, Ltd.), who is Hon. Secretary to the Chemical Engineering Group of the Society of Chemical Industry, by the members of the Group. The presentation was made at a complimentary dinner to Mr. Talbot, at the Hotel Cecil, on the occasion of his forthcoming marriage, and was a mark of the esteem in which he is held by the members of the Chemical Engineering Group, and a recognition of the valuable work he has done on their behalf since the Group was formed in 1918.

At the Gas Offices, Cardiff, on Friday, Oct. 13, Mr. FRANK H. OSBORNE (Clerk to the General Manager and Secretary) was the recipient of a handsome clock in mahogany, with Westminster chimes, suitably inscribed, as a token of esteem from the officers and staff of the Cardiff Gas Light and Coke Company, to mark the occasion of his marriage. Mr. H. D. Madden, the Chief Engineer, was in the chair, and the presentation was made by Mr. George Clarry, F.C.I.S. (the Secretary and General Manager), after short complimentary speeches had been delivered by Messrs. R. J. Auckland, T. Noall, and Wilfrid Jones, and Miss E. M. Williams, all of whom paid tribute to Mr. Osborne's services to the Company, and his genial temperament.

We welcome home safe and well from Smyrna Mr. CECIL V. GANDON, Engineer and General Manager of the Ottoman Gas Company, Ltd. We wish, however, it had been in more felicitous circumstances.

OBITUARY.

JAMES RANDALL.

We much regret to have to record the death, on the 19th inst., at Southend-on-Sea, of Mr. James Randall, who was 87 years of age. Mr. Randall was appointed a clerk in the service of the Tottenham District Light, Heat, and Power Company in May,

1851—four years after the limited Company had been formed for the purpose of supplying gas to Tottenham and the immediate neighbourhood. In 1859 the Company obtained their first Act of Parliament, and Mr. Randall was made Secretary on April 30 of that year. He continued to act in this capacity down to Dec. 31, 1906, when he was made a Director. It follows, therefore, that his connection with the Company in one capacity and another extended over a period of no less than 71 years. In 1902, when Mr. Randall had been with the Company for upwards of half-a-century, he was presented by the Chairman (the late Sir Corbet Woodall) with a massive silver bowl, "as a memento in appreciation of prolonged, faithful, and highly-valued service to the Tottenham and Edmonton Gas Light and Coke Company." It was accompanied by a cheque for 100 guineas. Mr. Randall attended a Board meeting at Tottenham on Tuesday of last week, and set out to keep a similar appointment at Southend on Wednesday, but was taken ill and died early the following morning.

The whole of his life had been spent in the industry. He was a Director of the Southend, Horley, Westerham, and St. Margarets Gas Companies, and was also Auditor of the Lea Bridge, Harrow, and Southgate Companies. Several of his sons also are connected with the industry. Mr. James T. Randall is Secretary of the Southend Gas Company; Mr. Harry Randall is Engineer of the York Town and Blackwater Gas Company; and Mr. Leslie Randall has recently received an appointment with the Harrow and Stanmore Gas Company. Mr. Randall was initiated in the Evening Star Lodge in 1882, and occupied the Chair in 1898.

The funeral took place on Monday afternoon—the service being held at All Hallows Church, Tottenham, when the Tottenham Company were represented by the Deputy-Chairman, Mr. Henry Bailey, Mr. H. D. Ellis, the Secretary (Mr. E. J. K. Fussell), the Chief Engineer (Mr. H. C. Smith), and many other members of the staff. The Southend Gas Company and the Horley Gas Company were also represented.

A PAMPHLET ON "THE THERM."

We have received from H.M. Stationery Office a copy of a pamphlet entitled "The Therm," which has been published by the Department of Scientific and Industrial Research. It contains reprints from the Official Reports on Gas Standards by the Fuel Research Board of the Department. Copies of the pamphlet can be obtained from H.M. Stationery Office at Imperial House, Kingsway, W.C. 2, and 28, Abingdon Street, London, S.W.; 37, Peter Street, Manchester; 1, St. Andrew's Crescent, Cardiff; and 23, Forth Street, Edinburgh. The post-free price is 4d.

In the preface an explanation is made in popular language as to the changes in gas supply and use which led up to the recommendation of the therm as a basis for charging in place of the cubic foot. After describing the changed conditions in the use of gas for lighting purposes, and as a fuel, the preface says:

The problem to be faced by the gas supplying industry and the country after the war was therefore to answer the question: How can the gas regulations be amended so as to enable the gas undertakings to make the most economical use of our coal in the supply of gas to the public, and, at the same time, how can it be ensured that the consumer shall pay for his gas at a price depending solely on its heating qualities? This was the problem which was referred to the Fuel Research Board by the Board of Trade.

The Fuel Research Board reached the conclusion that, in the interests of the economy of our fuel resources, the gas undertakings ought to be allowed more liberty in determining the composition of the gas they supplied, since local conditions varied in different parts of the country, and since there was varying local demand for the different bye-products which could be obtained by different methods of manufacture. They also found the existing checks on the heating quality of the gas supplied through the mains to be inadequate, and the tests required by the then existing Acts to be insufficient to secure that the undertakings supplied gas of a uniform and stated heating quality. Further, it was clear that the interest of the consumer, while it required the encouragement of the most economical methods of producing gas, could only be secured if he were charged for the heat which the gas supplied to him would provide.

The solution recommended by the Fuel Research Board took account of all these considerations. The gas undertakings were to be required to declare the calorific or heating value of the gas they intended to supply, and to keep to this quality within reasonable limits. The quality was to be recorded continuously by a recording calorimeter, and the records to be made available for inspection by the consumer. This method was to supersede the periodic test by the local gas examiners, of which notice was usually given to the gas undertakings. At the same time, whenever the gas undertakings altered the heating value of the gas they supplied, they were to adjust, free of charge, the burners fitted in the households of their consumers.

Secondly, the Board recommended a method by which the charge to the consumer should be based solely on the heating quality of the gas. If a gas undertaking supplied a gas of low heating quality, they would only be able to charge for the number of therms in each 1000 c.ft.

Thirdly, after the interests of the consumer had been protected in these two ways, the gas undertakings were to be given greater freedom in settling the composition of the gas they would supply, thus allowing greater variation in the methods of manufacture. This reasonable liberty would tend to secure a minimum price of gas to the consumer, and help to conserve the national coal resources.

As a result of a series of conferences, these principles received the general support of representatives both of the gas-making industry and of the consumers, and a scheme based upon the recommendations of the Board found legislative sanction in the Gas Regulation Act, 1920.

ELECTRICITY SUPPLY MEMORANDA.

On the Borough Council of St. Pancras there is a preponderant labour element. This is one of the Councils which, to "support" the electricity undertakings, speculated in the business of supplying small dwellings. It has been a perfect fiasco. Nothing was left undone to give prominence to the beneficent work that the Council were proposing to carry on among the occupiers of small dwellings. An attempt was made to boom the scheme by circulars, bills, posters, newspaper notices, and advertisements. The response was small; many of the users being tenants of the Council's own dwellings, in which the installation expenses were comparatively low. The ratepayers are fortunate in that the response was small; for, as it is, the loss on the business is serious enough. Here is a reprint of a statement respecting the working from the commencement to Sept. 30 this year:

Unprofitable Small Dwellings Scheme.

Cost of maintenance .			£116 7 0	Rentals received . .		£871 17 9
Salary of junior clerk averaged over six months . . .			71 15 0	Value of current supplied at 8d. and 6d. per unit . . .		626 0 10
Capital outlay—						£245 16 11
Cost of wiring .	£4183					
Repayable in ten years .	£418 6 0					
Interest at 6 p.ct. .	250 19 7					
	£669 5 7					
Averaged over six months. . . .			334 12 9			
Canvassers (excluding sales engineer) .			221 17 7			
			£744 12 4			£744 12 4

This shows a balance loss on working of £498 15s. 5d. What it would have been if there had been a flood of custom, it is difficult to say. The ratepayers are to be congratulated on the fact that the result is no worse. But the statement does not convey the whole story. It will be seen that there is nothing allowed in respect of management expenses, printing, stationery, &c. The rest of the business has to bear all the other charges appropriate to the small dwellings scheme. Then, in addition to the expenditure shown in the statement, there appear to be supplementary charges for services £1031, and special extensions of mains £456—together £1487. There is a goodly section of the ratepayers who are looking upon this speculation with anything but eyes of friendliness. We are not surprised.

Labour Management.

As intimated in the preceding paragraph, the St. Pancras Borough Council enjoys a labour majority; and so far as the electricity undertaking is concerned, they regard themselves as the victims of circumstances, which they attribute to the war. The Chairman of the Committee has made a report upon the work of the department from November, 1919, to July, 1922; and from this he appears to base the troubles of the department upon the inability to proceed with plant extensions. He states that when the war started in 1914, the extensions then proposed, and partly put in hand, were, at the request of the Treasury, cut down to half, both for the supply of boilers and the erection of a boiler-house, and the abandoning altogether of the main turbine house, buildings, and equipment. This hold-up, it is asserted, resulted in heavy additional capital expenditure; the cost of extending plant being nearly, and in some cases over, three times pre-war figures. This, he says, has operated adversely upon the immediate provision of a cheap and abundant supply of power. Now it is curious that up to the end of March, 1919, when the municipal reformers were in a majority, they were charging for lighting 4d., *plus* 2½ p.ct., and for power 1½d. The labour majority then took the reins of local government; and at March, 1920, the charge for lighting was 4d. *plus* 50 p.ct., and for power 1½d., *plus* 25 p.ct. The following year the price had gone up to 8d. per unit for lighting, and 3d. for power. But at March this year, the figures were respectively 6d. and 1½d. These show that, so far as the charges went, the Borough Council up to 1919 were able to get along very well without the new plant to which the labour majority attribute their misfortunes. The sale of current during three out of the last four years has remained nearly stationary. The figures for the year ended March, 1919, were 16,499,715 units; 1920, 14,843,074; 1921, 16,674,436; 1922, 16,536,907.

De-gassing the Electricity Industry.

There seems to be a rancorous disposition on the part of some electrical writers to oppose all combination in the matter of gas and electricity supply, although this may be the best way to comply with a public desire on a profitable basis, and, through economies, at a lower rate than an independent supply could be provided. One of the most short-sighted articles on this subject that we have ever seen from an electrical source has appeared in "Electrical Industries," under the heading of "De-gassing the Industry." It seems that what, through lack of knowledge, weighs heavily on the mind of the

writer is that all concerns that do business in both gas and electricity have a flat lighting rate for the latter, which debars its use for other purposes, particularly heating and cooking. This need not weigh heavily on the writer's mind, for it is not a fact; though it would not matter much if it were, seeing that, up to the present, the electricity industry has only been dabbling in electric cooking and heating at low rates, and there is nothing in the results to justify the drawing of any conclusions as to what would happen if electric heating assumed the dimensions of gas heating, with the heating season coinciding with the maximum lighting period, and heating being little required during the part of the year when there is the lightest load for lighting. If the positions were reversed—heating coming at the period of the lightest lighting load, there might be something to say in justification of the violent palpitations from which some electrical writers suffer when they assume that a pernicious effort is being made where the gas and electricity services are combined to prevent the rising of the heating and cooking load. The rising of the heating and cooking load to considerable dimensions would produce during the year a considerable sum of idle capital, for which somebody would have to pay.

Tottenham the Sinner.

The article in "Electrical Industries" appears to have been written on the thinnest knowledge of the facts, and moreover in the erroneous belief that no gas undertaking doing business in electricity will cater for any other requirements. The article presupposes that all men who produce these combinations, and sink capital in the supply of electricity, will then set to work to dam the growth of the latter business, and so depreciate the capital invested in it. The men who invest capital in this way are not fools; it is those who think they are who properly come into that category. It seems that the Tottenham Light, Heat, and Power Company have been taken as an example of a pernicious conspiracy to prevent the growth of electric cooking and heating. If so, their "pernicious" work is confined to a modest bit of territory. Mr. J. Fisher, the Electrical Engineer of the Company, has shown that the writer in our contemporary knows very little about the conditions that affect the Tottenham Company's supply. "Electrical Industries" stated that the Company have only one rate for electricity for all domestic purposes—"8d. per unit;" and in a letter to a consumer, they wrote as follows: "There is no possibility at the moment of any special rate being introduced to meet the heating load (domestic) on the electricity side. If you are requiring power for heating, I have no hesitation in saying that gas is the thing." Our contemporary regards this as the common outcome of the union of gas and electricity in one business. Mr. Fisher, however, writes that he is not aware of such a reply ever having been given to a consumer. The writer is mistaken about the price; and he obviously did not know anything about the Tottenham conditions. He apparently thought the Company were supplying electricity throughout their area instead of in only one corner of it, which had been electrically neglected until they took it in hand. The price, too, is not 8d. per unit. In his letter Mr. Fisher corrects this. The charge for current for lighting and domestic use is 7d. per unit for the first 100 units per quarter, and 6½d. per unit for all over 100 units; and this price has been in force since June last. It compares very favourably with many, if not most, of the London suburbs; and Mr. Fisher knows as a matter of fact that ordinary consumers get the current they require quite as cheaply at this rate as they would under many of the fancy systems of charging that are now in vogue. The prices, in short, are modest, having regard to the fact that the war came upon the undertaking at its very birth; and it has struggled through all the trials and tribulations of that and the succeeding period to a position in which the business became profitable. Not all electrical undertakings, in a similarly confined area and standing alone, could say this. However, Mr. Fisher admits that the Company do not give power rates for heating and cooking; and this for the simple reason that there would be no advantage in doing so on a D.C. supply system with current generated by gas-engines! When an increasing demand for lighting is getting satisfied, more or larger cables may be put down so as to be able to take on heating and cooking; but the expenses involved would, he is sure, be great, if electrical heating and cooking became general. He adds that "the price, if financially sound, would still make it much more costly than gas for these purposes, while the fable of saving food by electrical cooking was completely disposed of in the very careful experiment made at our generating station in response to a challenge of Mr. Belling some years ago—a challenge not since repeated!" The brief note appended to the letter by the Editor of "Electrical Industries" indicates that words and argument failed him. There are matters in the letter upon which it was perhaps discreet not to touch.

An Example.

We should strongly advise the writer in "Electrical Industries" to study the subject rather more deeply than he has apparently done before again attempting to descant—and so loosely!—on degassing the electricity industry. If he does this, he will find electricity undertakings run in conjunction with the gas business that are more profitable (and rendering extremely good service to the consumers) than could possibly be the case with, in similar circumstances, an independent undertaking. He ought to be pleased, instead of malignantly objectionable, over the fact that gas undertakings have taken up the supply of current in this way, and so made its virtues available where they did not obtain before. "Degassing the industry" would mean depriving people of just what he desires them to have, which is a most illogical attitude. We do not know whether the writer in "Electrical Industries" has ever had his attention directed to a paper that Mr. J. W. Napier read at the meeting of the North British Association of Gas Managers in 1916, in which he detailed the experiences in Alloa of combining the supplies of gas and electricity. For the twelve months ending May 15 of that year, the average working costs per unit sold totalled to 0·9d. This figure included fuel from the gas-works, oil, waste, water, &c., wages, repairs and maintenance, rents, rates, and taxes, management, office, and legal expenses, and insurance of plant. At that time, the price for lighting was 4d. per unit; and the power rates were on a sliding-scale ranging from 2d. per unit to 0·8d., with special rates for consumptions beyond the sliding-scale limits. How do these figures satisfy the writer in "Electrical Industries" for a town like Alloa? True they refer to six years ago; but they show that even so far back as 1916, the combination of gas and electricity was not to the disadvantage of the latter.

Foolishness.

An illustration of the miserable perversion of the truth that is indulged in by some writers in electrical papers is given by the contributor of "Cooking and Heating Notes" in the "Electrical Times" for Oct. 12. He heads an article "Electricity is Supreme for Intermittent Heating." It is not that of which we complain, because the points supporting the assertion are so conspicuously foolish, but of the statement that, with the gas-fire, "50 p.ct. and more of the heat value in the fuel passes straight up the chimney." Now we challenge the author of that statement to prove his point as to the 50 p.ct. It is either a falsehood, or a self-supplied testimonial to ignorance. We are satisfied that the writer has never made a scientific test with a present-day gas-fire to justify the statement; and, in fact, we doubt his qualifications for conducting any reliable research into the matter. If he is relying on any authority, perhaps he will supply us with the name of the authority, describe the means by which the tests were made, and the circumstances in which they were carried out. As to electricity being supreme for intermittent heating, it appears that the writer is suffering from the delusion that, immediately an electric radiator is switched-on, a cold bedroom becomes warm, which is, if anything, more grotesque than the 50 p.ct. of heat from a gas-fire being wasted up the chimney. We hope readers will not laugh; but the assumption is that a bedroom the temperature of which has fallen considerably becomes heated-up before heat has been given time to do its work, while the heat from a gas-fire is so much more deficient because it requires a little time to raise the temperature of a room to a comfortable degree. No one can raise anything even 1° in temperature until sufficient heat has been transmitted to do the work. While inviting the electrical writer to a test on the 50 p.ct. point, we will extend the challenge to a little competition in raising the temperature of a bedroom on a cold evening in winter, at a given rate of energy expenditure per hour. Will he take this on? We hope so, for the sake of the amusement we shall get. The tests for the waste heat of the gas-fire shall also be made by him, and from his method of procedure we should hope to extract some amount of interest. If he will accept these challenges, we will faithfully reproduce the results, and describe in these columns how the tests were made, providing he will do the same in our contemporary.

Electrical Exhibitions.

There has been an epidemic of local electrical exhibitions lately; and the manufacturers of cooking and heating appliances appear to feel the strain on their purses of these recurring events. There are space, equipment, transport, sales staff, and cookery demonstrators to be provided. This would not matter much if the returns at each show justified the expenditure; but apparently they do not. "Electrical Industries" points out that, in a competitive business, it is very difficult to refuse a central station engineer when an invitation is sent to exhibit. But our contemporary suggests that much waste of money would be saved if the manufacturers of electric cookers would get together, and arrange not to exhibit at any display where the electricity tariff is not on a basis comparable with gas, and where hiring facilities are not available. It is also thought that the manufacturers could extend this co-operation to a joint effort in increasing the demand for electric cooking apparatus.

The Safety of Electricity.

Newspaper reports state that Mr. Frank Lazenby's mansion at Sunningdale narrowly escaped destruction early last Saturday morning by the fusing of electric wires under the floor of the billiard-room. The occupants were aroused by the violent ringing of electric bells; the heat having caused short circuits. The bell-ringing was fortunate.

Midland Association of Gas Engineers and Managers.—The Hon. Secretary (Mr. T. Thornton) informs us that the autumn general meeting of the Association will be held at Birmingham, on Thursday, Nov. 16

LOCAL TAXATION IN SCOTLAND.

EFFECT ON GAS UNDERTAKINGS.

By J. W. Napier, of Alloa.

The issue of the report of the Departmental Committee on "Local Taxation in Scotland" and the main recommendations contained therein, are of more than ordinary importance to industrial undertakings—*e.g.*, railways, tramways, harbours and docks, gas-works, &c. The Committee, of which Lord Dunedin was Chairman, and which included among others Lord Weir and Sir John Lorne MacLeod, were appointed by the Secretary for Scotland under the following minute of reference: "To inquire into the present system under which taxation is raised by local authorities for local purposes in Scotland, to report whether the system is equitable and economical, and, if not, to suggest what alterations in the system are desirable."

The Committee in their report traverse the general literature on the subject of rating, including the memoranda and evidence of former Committees dealing with this involved subject, and refer to the inequity of the present situation. Allusion is made to the grave and harmful influence against the improvement and extension of industrial business. A manufacturing business is forced to expend capital on improvements in its productive facilities to enable it to reduce production costs, while such enterprise is immediately penalized by heavy increases in valuation and rating, with the result that the object aimed at is to a large extent nullified.

The whole subject of rating is admirably and succinctly dealt with in the report; but at this stage short reference only can be made to the recommendations as affecting gas-works. The question as to whether rating is to be upon the gross or the net valuation is dealt with. Burgh and county rates are on the gross, parochial rating on the net—as is stated, a most anomalous position. The origin of the "net" is to be found in the Poor Law Act, 1845, for deductions under the terms of section 37, which it is necessary to quote: "And be it enacted, that in estimating the annual value of lands and heritages, the same shall be taken to be the rent at which one year with another such lands and heritages might in their actual state be reasonably expected to let from year to year, *under deduction of the probable annual average cost of the repairs, insurance, and other expenses*, if any, necessary to maintain such lands and heritages in their actual state, and all rates, taxes, and public charges payable in respect of the same."

As is well understood, the parish councils, before proceeding to rate, must give effect to a suitable percentage deduction off the valuation as determined by the Assessor. These deductions are not uniform; and they vary considerably in different parishes. The Committee state that the evidence is unanimous that the power of each parish to fix its own deductions should be taken away, and that deductions should be fixed on a uniform scale by a central authority. The entire absence of unanimity among the parish councils is well exhibited in the table showing the range of these differences. Taking gas-works, the curious observation has to be made—and this in view of section 37 above quoted—that in eight parishes no deductions are allowed. Taking the counties as districts, the rates of deduction vary from as low as 5 p.ct. to as high as 75 p.ct. The latter figure is exceptional, the more usual rate being 20 to 35 p.ct.

The conclusion reached by the Committee is: "That section 37 of the Poor Law (Scotland) Act, 1845, should be repealed, and all rating placed on the gross valuation. Failing this, that the deductions permissible to parish councils under that section be fixed on a uniform scale by a central authority." It will be at once seen that, if the first part of the recommendation is agreed to and passed into law, the effect upon gas-works will be very seriously to increase the amount of taxation. It is fully expected that the clause will meet with severe opposition from railway companies in particular.

The Committee's report—known as the Dunedin Report—is at present waiting consideration, pending the report of a Committee presided over by Lord Mostyn sitting on other taxation problems. It should be pointed out that the Poor Law Act of 1845 is for Scotland only, and therefore the proposals of the Dunedin Committee have direct interest for Scottish industrial undertakings. It is learned that the subject has already had the attention of the Management Committee, Scottish District, of the National Gas Council.

Institution of Structural Engineers. — At an extraordinary general meeting of the Concrete Institute, on Oct. 19, held to confirm the resolutions passed at a previous meeting to change the title of the Institute to the Institution of Structural Engineers, the resolutions were confirmed without opposition.

London and Southern District Junior Gas Association.—The opening meeting of the session and re-union of the London and Southern District Junior Gas Association will be held at the Westminster Technical Institute, Vincent Square, S.W., on Friday of this week, at 7 o'clock, when Mr. D. Cleave Cross, of Lea Bridge, will deliver his Presidential Address. Following this, a presentation will be made to Mr. Frederick A. Frost, the immediate Past-President.

CONVERSION TABLES.

We have received from Messrs. Major and Co., Ltd., Tar Distillers and Petroleum Refiners, of Hull, a copy of "Conversion Tables for the Oil and Chemical Trades." In this well-printed and convenient book, Mr. L. N. Rawes has compiled a mass of ready information which should prove invaluable not only to buyers and sellers in those trades, but to engineers in general and to anybody who at times is apt to waste valuable time covering sheets with petty calculations, or searching through the heavier books of mathematical tables. The majority of the conversions are in respect of varying specific gravities and a wide range of prices. Thus we find "pence per English gallon" to "£ s. d. per English ton," for Sp.Gr. varying between 0·700 and 1·290; and for Sp.Gr. from 0·700 to 1·200 we have pence per English gallon into "shillings per 100 kg." The conversion into cents per American gallon is shown for an exchange rate varying between $3.45 and $5 to the £; and thereafter the simple money exchange from pence and shillings into francs has been worked out for rates from fr. 10 to fr. 100 to the £. After the converse to the above, the author deals with gallons to the ton for Sp.Gr. from 0·700 to 1·300, with Beaumé, Twaddel, and specific gravity equivalents, and with temperature conversions from −4° Fahr. to 212° Fahr. into Centigrade and Réaumur; the English and metric values being continued from boiling-point to 427° Fahr. = 219·4° C. After four pages of general conversions of great utility, we find sundry examples fully worked out for the guidance of the "unready reckoner;" and finally there are blank pages for purposes of memoranda. We congratulate Messrs. Major on their production, and trust the labour put into the compilation will be rewarded by a ready demand.

PODMORE DUST-PROOF LAMPS.

The demand for an effective dust and insect proof bunsen burner lamp has long been met by the Podmore upright self-intensified type, which has for years been a popular lighting medium. It is still a very suitable fitting for foundry purposes, laundries, &c.; and it has even been used in connection with dust destructor houses, for lighting rag-tearing machines, and all such dusty operations. In this upright type of lamp there is little glass employed—in fact, merely the chimney. With the aid of a reflector, too, the light can be carried a long distance.

Since, however, the inverted system has become the more generally favoured method of gas lighting, Messrs. A. E. Podmore & Co., of No. 33, Charles Street, Hatton Garden, E.C., have designed an inverted superheated cluster burner lamp on the same principle. This lamp, which is shown in the accompanying illustration, gives a light of from 500 to 700 c.p. The air is drawn through three tubes, from the base of the corona band which carries the glass, into a mixing chamber on the centre downrod leading to the injector tube. It is impossible for the illuminating power to be affected by any dust, except that which collects on the glass; and from personal observation we are able to say that the light is intensely white, and that the lamp is eminently suitable for business premises, schools, halls, and other places where central illumination is required.

An Inverted Cluster Burner Light.

The lamp is fitted with three mantles on a cast-brass superheater burner, and controlled by one tap above the mixing chamber at the top of the lamp. The three standard sizes—bijou, medium, and universal—of mantles are interchangeable. It only remains to be said that, like other articles produced by the firm, the lamp is intended for hard wear, being substantially built and well made.

Southern Association of Gas Engineers.—The Hon. Secretary (Mr. W. H. Bennett) asks the members to note that the annual general meeting of the Southern Association of Gas Engineers and Managers will be held on Thursday, Nov. 23, at the Charing Cross Hotel, at 2.30 p.m.

Scottish Junior Gas Association (Western District).—In reporting the proceedings at the opening meeting of the Association for the new session, it was stated [*ante*, p. 169] that Mr. J. M'Isaac took part in the discussion of the Presidential Address. The speaker was Mr. M'Intyre, of the Street Mains Department, Glasgow.

DESIGN AND CONSTRUCTION OF A 12½-MILLION GASHOLDER.

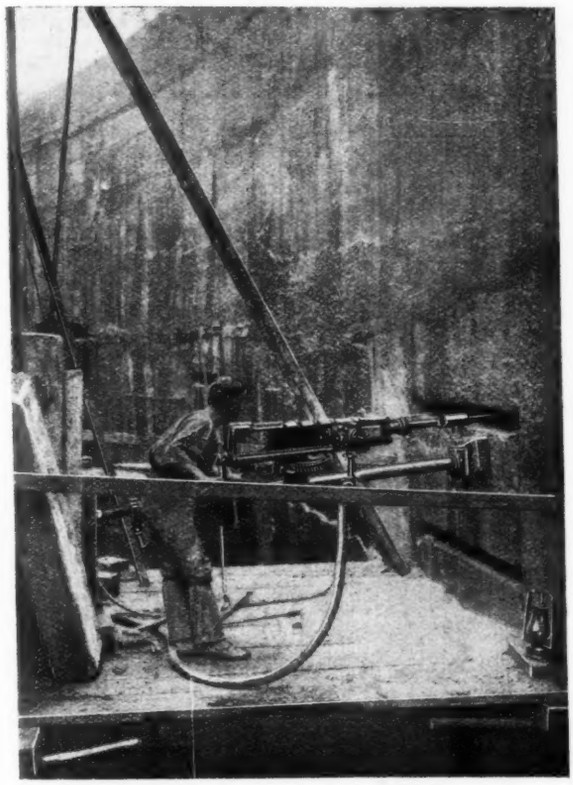
By R. J. Milbourne, Assoc.M.Inst.C.E., F.C.S.

(*Continued from p.* 163.)

Tank.

The tank is 300 ft. in diameter by 48 ft. deep below the concrete coping, while the annulus is 9 ft. in width. On the bottom, 68 concrete rest stones 18 in. deep are spaced equidistantly round the circumference of the tank. The 34 piers for the standards are of concrete, firmly anchored to the solid rock. Passing through these piers, and extending into the solid rock below them, for a total distance of nearly 20 ft., are four steel tubes through which the foundation bolts pass, terminating in the anchor plates, which hold together the ends of the bolts. The anchor-plate chamber, which is cut out of the solid rock, is 8 ft. 3 in. long by 6 ft. wide by 1 ft. 6 in. deep.

After the standards had been placed in their correct positions, the anchor-plate chambers were filled with concrete, and the tubes enclosing the foundation bolts were grouted in. The two shafts for accommodating the inlet and outlet pipes are 7 ft. 2 in. square, and the tunnels connecting these shafts with the tank annulus are of this width. After the inlet and outlet pipes had been fixed, the shafts and tunnels were filled-in solid with concrete. A valve-



VIEW SHOWING CHAMBERS BEING CUT OUT FOR ANCHOR PLATES OF HOLDING-DOWN BOLTS.

chamber is provided at the top of each shaft; the floor is drained; and the opening at the top covered with 5-16 in. plates supported on rolled-steel joists. Within the annulus stands the dumpling of solid rock, on which the timber framing that supports the crown when the inner lift is down is erected.

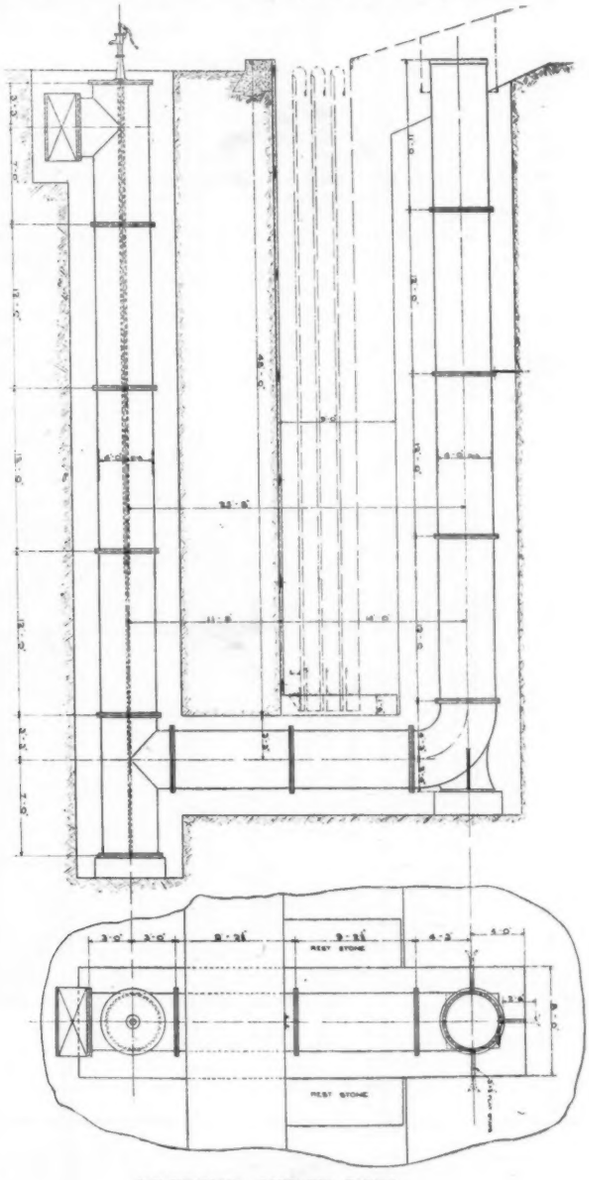
Holding-Down Bolts.

There are 34 sets of holding-down bolts, 2¾ in. in diameter by about 20 ft. long (136 bolts in all), and 34 sets of anchor plates. These bolts are arranged at 6 ft. 3 in. centres measured in a radial direction from the tank, and 4 ft. 7½ in. centres transversely. Their lower ends are securely held together by 12 in. by ⅞ in. steel flats forming anchor plates. The top faces of the openings, which were cut in the rock to enable the cotters securing the ends of the holding-down bolts to be inserted, were formed absolutely level, in order to give perfectly true and even bearings to the anchor plates, so that the strain is equally divided on each of the four bolts.

When the holding-down bolts were shipped, two sheet-iron templates were sent with them, giving the exact centres at which the four bolts of each set were to be built in, relatively to the face of the tank wall. When these templates arrived at Sydney, thirty-two more were made from them, so that each set of holding-down bolts had its separate template.

In addition to these templates, another one was sent made in steel, in two parts for convenience in shipment. This template had one curved side for setting up against the face of the tank; and when put together the two halves extended from the edge of one of the holding-down bolt templates to the edge of the next one. The whole thus formed a complete bay of the guide-framing from standard to standard.

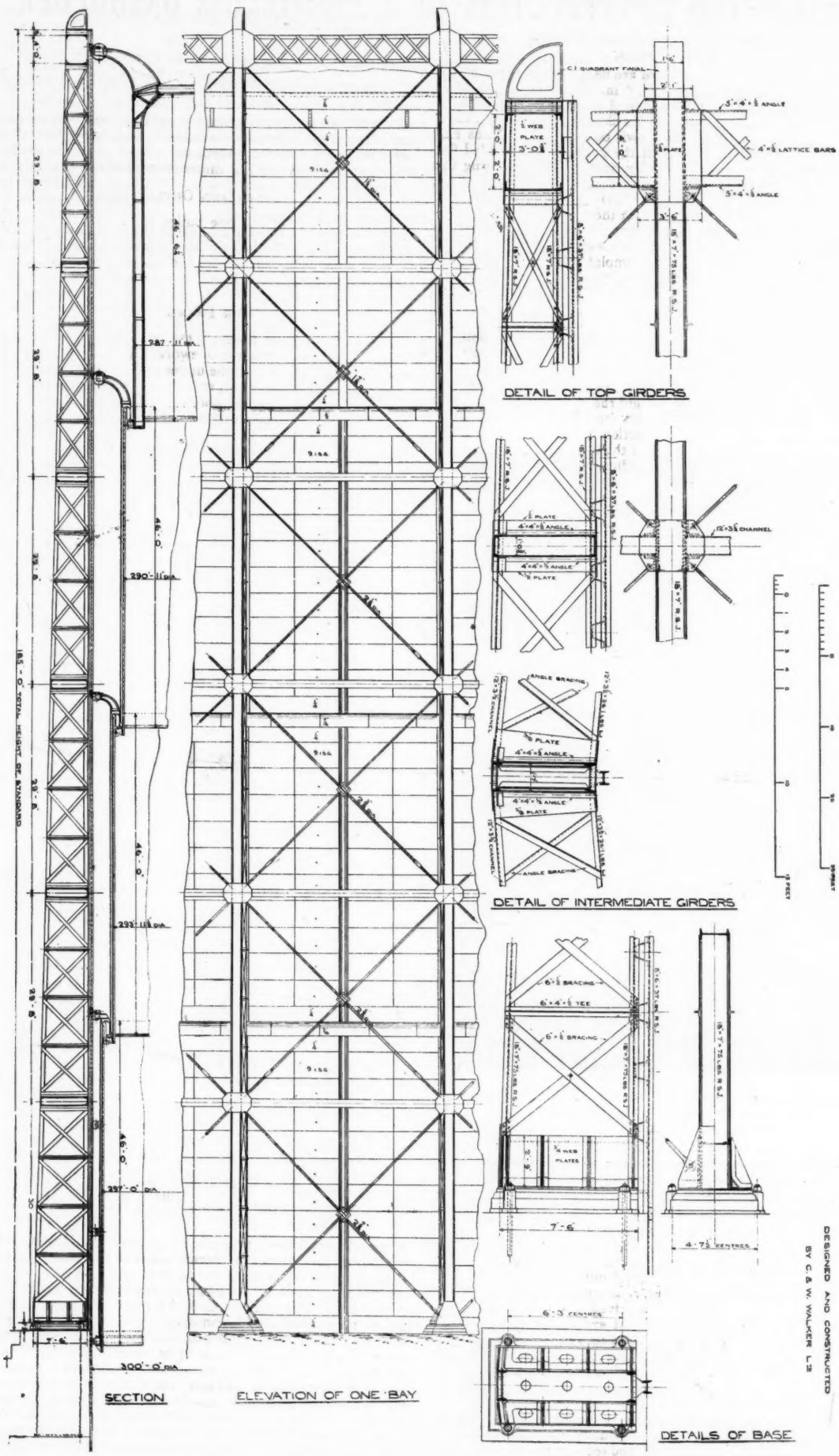
The method of procedure in fixing the holding-down bolts was as follows: One set of bolts, with stockings (*i.e.*, steel pipes 6 in. in



INLET AND OUTLET PIPES.

diameter) round them, was placed in position and accurately fixed with one of the templates over the ends of the bolts, and care was taken to see that the bolts were set plumb. When the template was correctly fixed, it was secured to prevent any movement from its position. The next set of bolts was then fixed in a similar manner; and the space between the two templates was gauged by the skeleton steel template, set with its curved face absolutely true to the tank wall. The space between the second and third sets of holding-down bolts was then gauged in a similar manner, and so on round the entire circumference of the tank. The two pieces of template for the distance apart from standard to standard were riveted up together at the site, so as to form one template from standard base to standard base.

The tubes set in the tank piers for the holding-down bolts were made 6 in. in diameter, to allow room for adjustment in fixing the standards. These tubes were grouted-up solid after the standards had been set in their final position, plumbed, and set perfectly



GASHOLDER—12½ MILLION CUBIC FEET CAPACITY.

true. Until then, the bolts were left with play all round; and care was taken to have the holes covered over to prevent their being choked up by loose material, &c., falling down.

TANK GUIDES.

Down the inside of the tank there are 68 guides, formed of 8 in. by 3½ in. by 3½ in. channels by 46 ft. 6 in. long, set on the same radial centre lines as the standards and intermediately between them. Each guide is fitted with seven cleats on each side; these being attached by means of ⅞ in. Lewis bolts to pad stones embedded in the side of the tank. All the guides were bedded flat against the tank side walls, to avoid springing when resisting the pressure of the bottom curb rollers. Full particulars of these were indicated on the drawings; and the following procedure was carefully observed in the setting-out of these guides.

A steel template was sent for preparing the holes in the stones built in the tank walls, to receive the Lewis bolts which secure the guides to the tank walls. This template was fixed perfectly vertical on the tank wall, and the holes marked-off on the stones. After these had been drilled and the bolts put in and wedged, the template was again fitted on over the bolts before the latter were finally run with lead or cement.

When the channel-steel guides were fixed to these bolts, a plumb line was kept on the guide, to which the channel could be set both radially and on the circumference of the tank. The latter precaution was most important, as practically no adjustment of the rollers was provided round the circumference.

The stones to which the tank guides are bolted were set, in the first instance, with some slight projection beyond the face of the brick or concrete work in the body of the tank wall. The stones were then dressed-off to the exact radius, as it was of vital importance that these should be fixed in their proper position both radially and circumferentially.

As provision was made on the bottom curb of the outer lift for a set of carriages arranged exactly equidistant all round the curb, the importance of spacing these guides accurately round the circumference of the tank was insisted upon.

The chord measurements from centre to centre of the tank guides were given on the drawings, and were checked all round. A further check was taken by the chord measurement from one tank guide to the next but one. These somewhat laborious precautions resulted in the guide-framing, including the tank guides, coming together without any difficulty whatever, and ensured the smooth working of the gasholder, as the various lifts were prepared throughout to exact dimensions to suit.

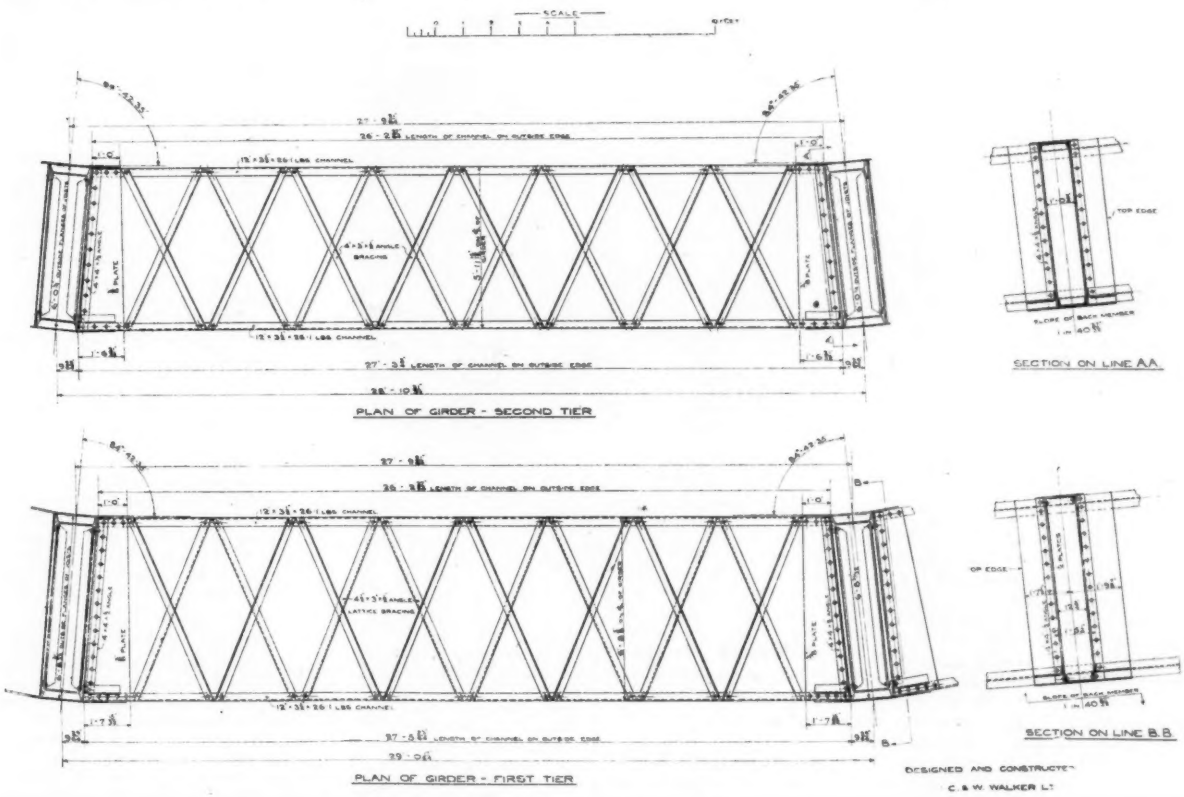
INLET AND OUTLET PIPES.

There is one inlet and one outlet pipe. They are 4 ft. in diameter, and have flanged machined joints. Within each outside leg a plunger pump and tube is fixed for emptying the moisture trap formed at the lower end of these pipes. Both inside and outside legs are supported on rest stones.

TIMBER FRAMING IN TANK.

When the lifts are at rest in the tank, the crown of the holder is supported on a timber framework. This consists of a series of short timber uprights, to the upper ends of which are attached a system of radiating wooden rafters. These are connected to each other by several rings of purlins. Both rafters and purlins are curved to suit the exact rise of the gasholder crown; and the whole structure is rigidly braced and strutted together both in a vertical and horizontal direction, so as to prevent reeling when the weight of the crown sheeting comes upon it.

(To be continued.)


SCALE
PLAN OF GIRDER - SECOND TIER
SECTION ON LINE A.A.
PLAN OF GIRDER - FIRST TIER
SECTION ON LINE B.B.
DESIGNED AND CONSTRUCTED
C. & W. WALKER LT.

Manufacture of Hydrogen.

In the course of a paper read before the Faraday Society, M. Georges Claude, of Paris, described the manufacture of hydrogen by the partial liquefaction of water gas and coke-oven gas. He has now for a number of years been engaged in the manufacture of hydrogen by the partial and direct liquefaction of water gas and its analogues. For this purpose water gas, compressed to a suitable degree, is deprived of its carbon dioxide and dried, and is then sent into a heat exchanger, in which it is cooled by circulating in the opposite direction to the hydrogen and carbon monoxide which have already been separated. The gas then enters the bottom of a set of vertical tubes, the lower portion of which is immersed in a bath of carbon monoxide boiling under atmospheric pressure; and by the combined influences of the pressure and of the temperature of the liquid bath, a large portion of the carbon monoxide of the ascending gases is liquefied. This flows back and replaces the liquid which is being evaporated. The remaining gas, containing hydrogen and a little of the residual carbon monoxide, continues to rise in the tubes. There the gases encounter a temperature which is, by special means, kept very low; and under this influence the remainder of the carbon monoxide is liquefied. Theoretically, therefore, it is a sensibly pure hydrogen which escapes from the top of the tubes; and this cold and compressed hydrogen is utilized to produce the very low temperature already alluded to, Inconveniences were, however, experienced which the author has only recently been able to overcome, by means which he describes. This process has now been developed and put into practice. M. Claude has studied the process which he outlines with a view to its application to coke oven furnaces, in which the presence of a considerable portion of methane renders catalytic systems inoperative. The complexity of the gas mixtures to be dealt with in this case, and the diversity of the freezing points of the constituents might lead one to expect serious difficulties in the working of the process; but, as a matter of fact, an apparatus has already been constructed for the purpose, and been put successfully into service at the Béthune mines. The essential cause of the success is the very high reciprocal solubility of the diverse condensible constituents. One of the main reasons that induced the author to count upon a development of the process in the coke-oven industry lies in its multiple potential advantages.

THE BRITISH COMMERCIAL GAS ASSOCIATION.

ELEVENTH ANNUAL CONFERENCE AT BRISTOL.

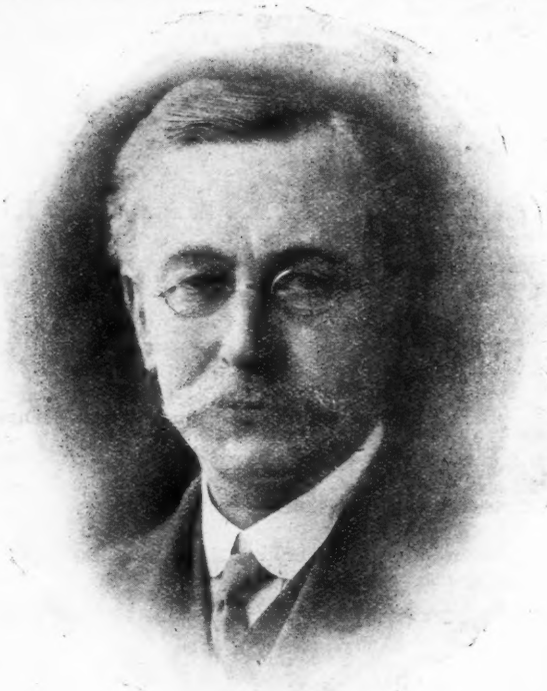
The Eleventh Annual General Meeting and Conference of the British Commercial Gas Association took place in Bristol from Monday to Wednesday of last week. The proceedings opened on Monday evening, when a reception was held by the Lord Mayor (Alderman Ernest H. Cook, D.Sc., J.P.) and Lady Mayoress of Bristol. There was a large gathering of members and their ladies, and many of the leading citizens of Bristol, the company numbering about 500. The Lord Mayor and Lady Mayoress, accompanied by Sir George E. Davies, J.P. (President of the Association, and Deputy Chairman of the Bristol Gas Company), received the guests in the Central Hall of the Bristol Museum and Art Gallery; and while the ceremony was in progress, an orchestra rendered excellent music. The main entrance of the Museum and Art Gallery opens into the large and lofty top-lighted Central Hall, which contains, on the floor level, a number of cases of exhibits. A spacious marble staircase leads, first, to a mezzanine gallery, hung with regimental and Dominion flags, and then continues to large picture galleries above, all of which are top-lighted.

The LORD MAYOR, in welcoming the members of the Association, said that Bristolians were always glad to receive visitors from any part of the world, and they were very glad to welcome those who now came to the city, because they were men of light, and, he supposed, of leading. He hoped that the members would derive great advantage from their meetings in the city. Referring to Sir George Davies, he said that probably no one was better known in Bristol, and no one had done more good work for the city to which he belonged. If a less powerful society had come to Bristol with Sir George as President, the members would have been warmly greeted by all Bristolians.

The PRESIDENT, responding, said what a pleasure it was to him that during the year he occupied the responsible position of President of the Association, the annual conference should be held in Bristol. They all appreciated the opportunity which the Lord Mayor had given them of meeting together before commencing the serious business of the gathering, which was to consider the best and most efficient way the gas industry might be applied to the service of the community. They were all very happy to be able to renew their acquaintance with those they had met at previous conferences. He thanked the Lord Mayor and Lady Mayoress very heartily.

LIGHT AND LIFE.

Following the reception, a lecture was delivered by Sir HENRY GAUVAIN, M.D., M.Ch., M.R.C.S., L.R.C.P., in the Lecture Hall of the Museum and Art Gallery, on "Light and Life." The lecturer was introduced by the President, who pointed out that Sir Henry had been medical superintendent of the Lord Mayor Treloar Cripples' Homes at Alton, Hants, and at Hayling Island, since their formation in 1904, and was acknowledged throughout the country an authority on tuberculosis.



Alderman Sir GEORGE E. DAVIES, J.P.,
Deputy-Chairman, Bristol Gas Company.

Sir HENRY GAUVAIN said that it was peculiarly gratifying to medical men to notice the tendency which had been apparent of late years, and was always an increasing tendency, on the part of the public, particularly the educated and intelligent public, to become more and more acquainted with matters appertaining to public health. Though "light" therapy had been practised ever since the hospital at Alton had been established, yet it was not until the summer of 1921 that anything like considerable public interest was taken in the work, when the glorious sunshine did so much good to the country. The sun during the summer of 1922 was conspicuous by its absence, and made us feel the need of it. The sun was the source of nearly every form of energy on this earth, and was an indispensable factor in our lives. The sun, by its action on the green colouring matter of plants, the mysterious chlorophyl figment which existed in the leaves of plants, had its physical energy converted into chemical energy; and the result of that conversion was the growth of plants, and from these we, the animal life of the globe, derived our strength. The chlorophyl produced the trees, and these, in ages past, died away and were submerged, and had become "bottled sunshine" in the form of coal; and this bottled sunshine was now made use of for lighting, heating, &c. He could hardly conceive how we should be without light.

A great deal of research had been done in the action of light in connection with the prevention of disease. Rickets, for instance, which Dr. Saleeby had described as one of the diseases of darkness, had been until recently, and still is by some, thought to be due to deficiencies in certain essential properties in diet. It was known that if they fed an animal on a diet which was deficient in certain properties—vitamines and the like—it would acquire rickets. Many children in the large towns of this country were attacked by rickets. In some great cities in India the children of the very poor people, who lived on a very inferior diet, played in the open air, and did not get rickets; and in those same cities the children of the wealthy Hindoos, who were kept secluded and tended very carefully, acquired rickets. Other investigations into the curative properties of light were also referred to.

Dealing with the tubercle bacilli, which had caused more disease, suffering, and death than any other, he said that this could be slain by exposure to light. Light had a great antiseptic power. He quoted what he considered to be one of the best descriptions of the value of sunlight, by Norman Davey:

> "The sun is a great dispeller of ill-humour. He is a healer, a life-bringer. He is the only true doctor to the troubled mind. He is the best apothecary in the world. There is no tonic sold for gold over any chemist's counter so remedial as that celestial pick-me-up which is poured for nothing at daybreak over the wide counter which is the rim of the earth."

The lecturer then exhibited a number of slides illustrating the work carried out at the Lord Mayor Treloar's Homes at Alton and Hayling Island, and the wonderful results obtained by the action of sunlight.

Coming to the question of smoke, he said it was a sad thing that so little effort was made to prevent this. He was glad to be able to speak to men connected with the gas industry; he wished the industry all prosperity if it would enable us to have cleaner cities and purer air. It was strange that we, the most hygienic people in the world, should tolerate that filthy air, and fill our lungs with it every day of our lives, when a great deal of it could be avoided by exercising a little more care and securing sensible legislation.

Reverting to the curative properties of light, Sir Henry threw out the suggestion that an Association with such power as the "B.C.G.A." might do an enormous public service by making investigations into the value of light by gas, by using certain of the rarer earths, and so imitating the healing rays of sunlight. This would afford a cheap and easy means of providing artificial sunlight throughout the country. Artificial daylight through the medium of gas would be cheap and accessible to everybody.

The LORD MAYOR proposed a hearty vote of thanks to Sir Henry for his lecture. They were all impressed with the extraordinary success which had attended his efforts at Alton. He himself was astonished that such wonderful results could be obtained in this country, where the sky was so often grey and dull. He expressed the hope that Sir Henry would continue his good work for many years to come.

Mr. D. MILNE WATSON (President of the National Gas Council) in seconding, said that they had all been extremely interested in and

instructed by the lecture. If gas could help forward the good work carried on by Sir Henry, all those connected with the industry would be proud. He was sure that Sir Henry's suggestion would stimulate all in the industry.

After Sir Henry had briefly acknowledged the vote of thanks, the members and visitors made their way to the old Drill Hall at the Museum, where refreshments were served, and musical items were rendered by the orchestra.

THE BUSINESS MEETING.

On Tuesday morning the members were again welcomed by the Lord Mayor and by Mr. E. H. Howell, J.P. (Chairman of the Bristol Gas Company), in the lecture theatre.

The LORD MAYOR said how delighted he was to be present. On the previous evening he had had the pleasure of welcoming the members to a portion, at any rate, of the social side of Bristol. He had now to give them a welcome to Bristol as a work centre; and they were the workers. In welcoming to the city such an important body of gentlemen engaged in such an important industry, it called up memories of the time when he was a student in the laboratories at the College of Science, and when the old photometric apparatus was in use. They knew of the difficulties that they had had in ensuring that the candles were of exactly the same size and composition. He remembered these difficulties vividly, and also the improvement that took place when Harcourt introduced the pentane lamp; and, generally speaking, the whole method of testing the quality of the gas by its illuminating power came to his mind. Some 30 years ago the Bristol Gas Company, assisted by the then Head of the Technical School there, had decided to give three lectures dealing with the gas industry from three points of view. The first was delivered by the Professor of Engineering, who dealt with the engineering side of the industry; the second was by himself, dealing with the physical side of the industry; and the third was by the Principal, dealing with the chemical side. All those lectures were extremely interesting, as showing how widely scattered were the interests of gas makers. In preparing his lecture on the physical side of the industry—heat and light produced by gas—he remembered being very much struck with the fact that the photometric method of measuring the quality of the gas was not altogether desirable or scientific, and he had ventured to suggest that a far better and more scientific way was to buy and sell gas by its calorific value rather than by its photometric power. This seemed like something from the dim and distant past, but he assured them that the peculiar circumstances that arose in connection with that long-ago lecture came back to his mind vividly at the time of the introduction of the Gas Regulation Act. He sometimes read a certain (should he say peculiar?) newspaper, and he had noticed that that newspaper possessed some peculiar correspondents; and it was extremely amusing to read the different notions that existed about that newly discovered animal, the therm. Of course, one could, he supposed, afford to smile at these things; but he had seen that the London County Council thought so seriously of them that they had appointed a Committee to investigate—to investigate what, he hardly knew. He thought that an investigation by any competent body would distinctly show that, so far as one could judge, the method adopted by the Government in this matter was really a common-sense one. To the average cost of production during the three years before the war had been added a certain amount in consequence of the unavoidable expenses incurred since 1914. Of course, it all depended on the amount of the unavoidable increase. [Laughter.] However, the present system seemed to him to be the basis of an accurate and scientific method of judging the quality of the gas, and he felt sure that, whatever might be the result of this "stunt," gas would be bought and sold on its calorific power in the future, rather than on its illuminating power. He would also like to say in this regard that they all realized what an important person the Act had brought into existence. It had brought into being two classes of persons—the Gas Referees and the Gas Examiners. It was a matter of great importance that, if the industry were to be carried on without being unduly and unfairly hampered, these gentlemen should possess the highest scientific skill. The determination of the actual calorific value of the gas required skill. What, then, would be their surprise when he told them that only a few weeks ago he had found that a gas-fitter in a small way had been appointed a gas examiner. In another instance, a young medical man, who, of course, was more accustomed to handle delicate instruments, but who had probably never seen a calorimeter, or who never knew much about it, was also appointed a gas examiner. It seemed to him that it was in the interests of those who produced this commodity, and of those who used it, that the accurate and proper evaluation of gas should be undertaken by properly skilled people. [Hear, hear.] There was one other thing. He felt that the lecture by Sir Henry Gauvain on the previous evening must have impressed those who heard it. It had brought home to all of them the immense curative value of bright sunshine and clean air. The pall which overhung our great cities and centres of population should be removed as entirely as possible. When they burned untreated fuel, that pall must get out into the air. One remedy was obvious. Gas-fires could be introduced, and by their use none of this black pall of carbonaceous matter was produced. Finally, he hoped the members would go away with the knowledge that they had spent a valuable three days in the city.

The PRESIDENT, in asking Mr. J. H. Howell, J.P. (Chairman of the Bristol Gas Company), to address the meeting, said he could only say to the members that it was their loss that Mr. Howell had not represented the Bristol Gas Company at many of the conferences of the Association, instead of himself. He acknowledged the kindness of Mr. Howell, and the cordiality with which he and himself had always worked together.

Mr. J. H. HOWELL said it gave him great pleasure, on behalf of the Bristol Gas Company, to join in the welcome which had been given by the Lord Mayor, and especially so because the President (Sir George Davies) was Deputy-Chairman of the Company. He had been associated with Sir George for very many years. It was particularly appropriate that the Association should meet in Bristol, because, without giving too much credit to the city—he was born in Manchester—he would remind his audience that Bristol was the very first city to illuminate its streets. John Breillat, the first Engineer to the Bristol Gas Company, notified the public, in September, 1811, that he would use the new illuminant in his shop, and also at his own cost would illuminate an adjacent street, thereby anticipating London by one whole year—Westminster Bridge was illuminated in 1812. This stood to the credit of Bristol. John Breillat was appointed Engineer and Manager to the Company in 1816, and remained in their service until he died. His portrait worthily adorned the walls of the board room of the Company. There was one industry which was of the highest importance in times of peace, because without it the amenities of life and the convenience would be absent. He alluded, of course, to the gas industry. If that were so, of what importance was it in time of war? It was a supreme necessity; and it was to the everlasting credit of the late President of the Association (the late Lord Moulton) that he had mobilized and, he might say, had forced all the great gas companies to produce the essential T.N.T. in enormous quantities. Without this we should have lost the war. The public did not know that, but they ought to.

The PRESIDENT, in thanking the Lord Mayor and Mr. Howell for the welcome which they had extended, also expressed the hope that the members would enjoy their visit to the City, and would derive benefit from it.

Alderman Sir GEORGE E. DAVIES, J.P., then delivered his

PRESIDENTIAL ADDRESS.

It is a matter of pride to me to have held the position of President of this Association for the past year, and I am glad to be addressing its members from this chair in the City of Bristol, to which they have already been welcomed, both by the head of its Corporation, of which I am a member, and by my old friend Mr. Howell, the Chairman of the Bristol Gas Company, with whom I, as Deputy Chairman, have the pleasure of working in perfect harmony.

The reason why I regard it as a pleasure and privilege to occupy the Presidential Chair of the British Commercial Gas Association, and to give that body all the support and encouragement in my power, is because the Association, in my opinion, stands for activity and development of the gas industry as expressed in efficient and progressive Public Service, on lines that do not take the place of, but rather stimulate and assist, individual effort; because it emphasizes our duties and obligations, as well as our rights and privileges—an attitude of mind that in many quarters is sadly lacking in these days; because it stands for a policy that keeps in the forefront the fact that business, to be of permanent profit and legitimate pride to those engaged in it, must be conducted for the mutual advantage of all parties; because, in short, it stands for Service, first and last, in the best and widest sense of that great word.

I am glad, moreover, to have presided for a year over the "B.C.G.A.," and to have been associated for some considerable time previously with its operation (and I hope, let me add, to continue that association for many years), because its policy, from its inception and through its never-ceasing growth, has been pursued by its organizers and members with that enthusiasm which is the essence of business, and with a consistent effort to serve the interests of the industry and of the community as a whole, instead of those of any section, or undertaking, or individual.

The subject of our conference as a whole is "The Gas Industry as a Public Service;" and we, of the gas industry, are proud to regard ourselves as engaged in a great public service. But we need constantly to remind ourselves—and we are grateful to the "B.C.G.A." for taking every opportunity of reminding us—that the only legimate basis for such a pride is that our service to the community from which we derive our rights shall be always of the best and most active, and in no way stagnate or become "officialized" as public services are apt to do.

EDUCATING THE PUBLIC.

As one of our most distinguished Presidents—the late Sir Corbet Woodall—pointed out in his address to the first annual conference of the Association at Manchester just ten years ago, one of the duties which is entailed upon every gas undertaking (company owned or municipality owned) is that of educating the public in its district thoroughly and persistently as to the numerous and varied—the "thousand-and-one"—ways in which gas can be of service to them; how it can serve them in home, in factory, in shop, in school—everywhere, indeed, where light, heat, and power are needed—and of teaching them how most economically and efficiently to use it. This is not only a profitable policy to pursue, it is a bounden duty that follows from the exclusive right to supply, because unless the sale of gas be developed to the utmost in a district, the price will not be as low as it otherwise would be; the conditions of life in our homes and workshops will be more arduous and trying than they need be; and the health of the community will not be improved as it might be.

I should like to emphasize the last point. We have heard from Sir Henry Gauvain, as we have before heard from Prof. Leonard Hill, Dr. Saleeby, and other witnesses before the Smoke Abatement Committee, how directly the removal of the smoke barrier between our cities and the sunlight has relation to the health of our citizens. It is a fascinating story, and a cheering one, because the barrier can be removed; and I should like to say, as my predecessor in this Chair, Mr. Milne Watson, said last year in the

course of his Presidential remarks at Glasgow, that this linking-up of our work with the public agitation for clean air, as the next step in a sanitary campaign which has already given us clean water, cleaner bodies, and cleaner streets, is a welcome inspiration to those who look to their business in life for an opportunity of public service as well as for personal profit.

FEW ACCIDENTS FROM GAS.

Viewed from this standpoint, also, the boon which the introduction of gas into the homes of the poorer workers in our towns and cities during the past 25 years has conferred upon not less than half the entire population of the country, is a cause for no little satisfaction. In addition to the enormous saving of drudgery for the women, and the increased comfort and improved cooking which the gas-cooker and the slot-meter have brought about, and the marked beneficial effect on the atmosphere of our urban areas, the almost complete removal from the list of causes of accidental death in our towns of the cheap oil-lamp, which was at one time such a fruitful source of disaster, is a cause for much thankfulness; and this should be borne in mind by those inclined sometimes to give disproportionate prominence to the extremely few accidents that arise from the use of gas—use, be it remembered, by the great majority day in, day out, for 365 days in the year.

The few accidents that do arise from the use, or rather misuse, of gas could, however, be reduced much nearer to vanishing-point if the public were even better informed than now they are as to the best ways of using gas for the numerous purposes to which it can be advantageously applied; and this brings us back again to the duty (as well as profit) of carrying on educative work among our consumers—present and prospective—thoroughly and persistently, by all effective means.

The "B.C.G.A." has done a great deal already, both by direct publicity work in the many directions in which it can only be done by co-operative action, and by providing suggestions and material to enable undertakings to carry on local propaganda in the most effective and economical way. Here I would like to make special reference to the publication during my year of office of the "Teachers' Notes of Lessons on the Manufacture, Distribution, and Use of Gas," which I regard as one of the most valuable services the Association could have rendered. We have presented copies to all the schools in Bristol; and the acknowledgments we have received have been most gratifying, and indicate that the book will be gladly and freely used as a basis for teaching the rising generation something—and that something a correct something—about the properties and uses of town gas. I hope every school in the country will have copies in their libraries before long. As I have said, the Association has already done much on a national scale; and given the funds, there is practically no limit to the fruitful work which it can do for the industry in the future. But the "B.C.G.A." can only help us to do what we ought to do for ourselves in every district—namely, carry on a persistent and consistent campaign of direct publicity among our own consumers.

THE DUTY OF DIRECTORS AND OFFICIALS.

I am a great believer in the future of the gas industry. I believe that the sale of gas to-day is far less than it might be; that the progress made in the past ten years, remarkable as it has been, is nothing to what it can be in the next ten years. But I believe that the progress must be achieved through our own efforts; and I do not believe that we are as yet doing all, or anything like all, we could towards securing the best possible results. The duty of directors and officials of the gas industry is to be actively and constantly planning to sell gas, to secure the greatest possible increase every year, even if this means the extra responsibility of expanding our works and our organization as a whole; and we are asking ourselves if we are constantly working to improve our service—alike in manufacture, in distribution, and in the assistance and education of our consumers in respect of the utilization of our products. How many of us are doing all we can, not only to educate the public, but to educate and train our own employees? On the last point I am glad to know that schemes are now in hand from which great things are hoped, both on the technical and on the service side of our work. I wish these schemes every possible success.

The publicity work of the "B.C.G.A." provides an invaluable foundation for local propaganda, and its organization is indispensable for furnishing ideas and material for such work. But we must not only give it our full financial and personal support; we must also build our own local edifice of public service and propaganda on the foundations and with the material provided for us, if the best results are to be secured. The need for educative work, national, district, and local, has never been more clearly demonstrated than in the past year. We have had two Press agitations in the past twelve months upon matters connected with public gas supply, both founded upon a misunderstanding of the facts by the public and by those to whom the public look for information—the writers of our daily newspapers.

I am not going to say anything harsh about the Press. There is a tendency at times in certain quarters to take up a case that promises to provide "copy" without a full and impartial examination of the facts, and, having adopted a line of criticism, to look with disfavour upon anything which tends to show this line to be unsound; but a section of the public appears to prefer highly-seasoned fiction to the less exciting, if more wholesome, truth. The supply is accordingly forthcoming; and we must patiently just do our best to counteract its influence when we happen for the moment to be the object of attack. Speaking generally, however, the Press of this country is both willing and anxious at all times to give its readers accurate, as well as interesting, information on subjects of general importance; and it is our business to see that, so far as the gas industry is concerned, the newspapers are constantly and promptly supplied with all the facts—the news—likely to be of interest to their readers who are our consumers.

That this has been, and is being, thoroughly well done by the editorial branch of the "B.C.G.A.," so far as news of a general or national character, and articles of general domestic and industrial interest, are concerned, all of you are, or should be, aware; but it is for each undertaking also to see that the local Press is equally well supplied with information and is constantly taken into confidence by directors and managers as to the policy, progress, and position of the undertakings. We believe in this policy in Bristol, and we can certainly congratulate Mr. Halliwell and the Bristol Press on the excellent results that such co-operation and mutual confidence have produced. We in the gas industry have nothing to lose and everything to gain by publicity for the facts concerning our policy and our relations with our consumers. All we ask is that it shall in truth be facts, fully and fairly presented, whereby we are judged.

THE GAS REGULATION ACT.

The next point I wish to refer to is the altered conditions under which the gas industry is being carried on in consequence of the passing of the Gas Regulation Act of 1920. It is well that consumers of gas should understand that this Act was passed to safeguard their interests after an exhaustive inquiry on gas standards by the Fuel Research Board, appointed by the Government, and that the conclusion then arrived at was that no system of charging could be regarded as satisfactory which did not include the recording of the heating quality of gas supplied to the consumers—especially in view of the fact that the value of gas to the user to-day depends upon its heating power, whether it be used to produce artificial light by heating a mantle to incandescence, or directly as a fuel, or to produce power in an internal combustion engine. We no longer judge the value of gas by its illuminating power measured in relation to the light given by the gas-flame itself, as we were required to do by former Acts of Parliament. We now judge it by its heating power or calorific value. What the consumer wants, therefore, is not what he used to get—namely, so many cubic feet of gas which if burned in an argand burner would give a light equal to 15 or 16 candles. Such a standard has no value for him now, seeing that if used to heat a mantle to incandescence, the same quantity of gas would give a light equal to ten times as many candles, or more.

What the consumer to-day wants is to be supplied with gas which if burned will give so many heat units, and to be called upon to pay only for the heat units he gets. Thus, if he gets 10,000 c.ft. of gas, each capable of developing 450 units of heat on combustion, he does not want to pay more than if he is supplied with 9000 c.ft. of gas, each of 500 heat unit power. In both cases he will have been supplied with the means of developing 4,500,000 heat units, or 45 therms—the name given by the Act of Parliament to 100,000 British thermal (*i.e.*, heat) units, regardless of the number of cubic feet required to produce them. The consumer, therefore, is in a better position to judge of what value he will get for his money if, instead of being quoted a price "per 1000 c.ft.," of which the heat value may be more or less, he is quoted a price "per therm," of which the heat value is constant—a unit of charge which disregards what I may call the size of the parcel in which the goods are contained, and ensures that he will pay only according to the value of the gas supplied.

Heat is "the goods," not feet. What matters is the capacity to perform a definite duty, not the mere volume of the material delivered—in other words, quality not quantity. In order to make your calculation, you multiply the feet by the heat, and see how many 100,000 units have been delivered through the meter. Then you price them out "per therm," which means "per 100,000 heat units." There is nothing mysterious about this, is there? Now if a company were supplying gas each cubic foot of which would give 500 heat units when burned, and were charging for it at 5s. per 1000 c.ft. (equal to 500,000 heat units), what difference would it make to the consumer if, instead, they charged him at 1s. per 100,000 heat units and called it "per therm?" Obviously none.

The advantage of the new system, over and above the fact that it makes all gas prices strictly comparable, is that, without any expense of going to Parliament or the Board of Trade for authority, any undertaking can alter the size of the parcel—in legal and scientific language, alter the calorific value per cubic foot of the gas supplied—to any extent they find desirable, by simply giving their consumers a quarter's notice and undertaking at their own cost any adjustment of the consumers' appliances necessary to ensure the efficient burning of the altered gas, so that the consumer can get the full heat value out of it; the heat value continuing to be the basis of the charge to him as found by multiplying feet by heat. Under this plan, directly an undertaking finds that it can manufacture and deliver heat units to its customers more cheaply per 100,000 heat units if they are delivered at the rate of (say) 500 to the c.ft. instead of 450, it can announce to those consumers that after a certain date every cubic foot that goes through the meter will be capable of giving them 50 more heat units when it is burned. They will go on paying per 100,000 heat units—*i.e.*, per therm—but probably at a lower price, because

the undertaking has been able, without vexatious delays, to take advantage of the latest improvements in manufacturing methods or of variations in the relative cost of coal and oil as the raw material for manufacture.

"But," Mr. Consumer may ask, as he is clearly entitled to ask, "how do I know I am getting the heat value per cubic foot you tell me you are giving me, and how do I know whether a therm is as good if delivered at the rate of 500 heat units per cubic foot as if delivered at the rate of 450 or 400 heat units per foot?" Our reply is, first, that the heat value of the gas delivered has to be continuously recorded on calorimeters at our works and on our districts, and must be up to standard to the satisfaction of the local authorities. Secondly, that the careful investigations of scientific men within and without the industry have clearly established the fact that, within a wide range of variation in the calorific value of gas—that is, in heat value per volume—one heat unit is as good as another. That is to say, each heat unit in a cubic foot containing 500 will do as much useful work as each heat unit in a cubic foot containing 400, and *vice versa*—provided that certain simple and easily effected adjustments are made in the appliances in which the gas is used, to render them suitable for the quality that is being supplied.

THE SCIENTIFIC THERM.

The suggestion which has been made, that heat units supplied in comparatively rich gas are of less value than those supplied in comparatively poor gas, that therefore the therm has a varying value to the consumer, and that rich gas is the cause of higher bills, is not supported either by the careful experimental work that has been done on the subject or the practical experience of consumers, such as railway companies, who are supplied at different stations with different qualities of gas. The idea to which expression has been given recently in some quarters, that the gas industry is making greatly inflated profits, and that the public are paying enormously increased bills for gas in respect of identical service, because of the introduction of the therm system of charging for gas, is absolutely devoid of any foundation whatever. The therm system of charge is scientific, is just and equitable, causes no increase but contains promise of decrease in consumers' bills, and was devised and introduced in the interests of consumers by the Board of Trade and their technical advisers.

GAS BILL COMPLAINTS.

What then occasioned all the outcry over "big gas bills" for the June quarter, which were freely and persistently ascribed to a change in the method of charge that in some districts had been in force for a year or more, and in others, where the complaints were as numerous, has not been adopted at all so far? First, a very cold, damp spring and summer this year in comparison with an exceptionally hot and clear spring and summer in 1921. In London, for example, the temperature was 40° and under in the first week of April this year, as compared with 50° and over in the same week of 1921; and similar differences applied almost throughout the quarter. Secondly, a three months' national coal stoppage began on April 1, 1921, and everyone economized in fuel of every description—the weather making this particularly easy. Thirdly, in many districts, 1922 is the first year since 1914 that consumers have been able to get unrestricted supplies of gas. Given the climatic conditions making its use a comfort, and the fact that after many years it could be obtained freely, is it surprising that the number of people, who in every quarter of every year find it difficult to believe they or their households have used the gas recorded by the gas-meter, should have been greater than usual; and that, given a lead, they should have with one consent ascribed to the poor unfortunate therm the unpleasant fact that their bills were unexpectedly high?

EXPLAIN THE GAS-METER.

Reference to the meter record prompts me to say that gas managers and their staffs will find it profitable to let information on the construction and working of the gas-meter form part of their local propaganda work. It is bound to interest the consumer, and to convince him that his suspicions of the meter are often ill-founded, to know that every meter is independently tested by a local authority before it is issued; that there is a greater margin of error allowed in favour of the buyer than of the seller of gas under the Act governing the testing of meters; that the percentage of error in a meter that has gone "slow" is, on the average, much greater than that in a meter that has become "fast," and why; and, finally, that the consumptions recorded by the meters on a district never total up to more than 92 to 95 p.ct. of the gas recorded by the works meters as sent out, while leakage accounts for much less than the difference. I understand the editorial staff of the Association have in hand the preparation of literature dealing with these points.

We may state, then, with confidence that the consumer is better protected as to quantity, quality, and price in the case of gas than in regard to any other household necessity. If anything is needed to complete my case, it is forthcoming in the fact that, in regard to all statutory company gas undertakings, profits are restricted either by maximum dividend clauses in their private Acts, or by the operation of sliding-scale clauses which provide that an increase in dividend to the shareholders must be preceded by a proportionately much larger reduction in the cost of gas to the consumers, and that a rise in price must be followed by a fall in dividend. With such a basis for our relations with our customers, has not the gas industry every reason to court the publicity which this Association exists to secure for it?

EVER-GROWING SUPPORT OF THE ASSOCIATION.

To advertise is not necessarily to be blatant or offensively obtrusive; it is merely to inform. An old meaning of the word, ndeed, was "to instruct;" and the primary business of this Association is to ascertain the truth about all the possibilities of service which the industry can render to the community, and to inform and instruct the community thereon in the most attractive, effective, and convincing ways. Its further business is to inform its members on all branches of gas service; to assist them in the work of informing their consumers individually in each district; and to aid and inspire them in raising the quality of their service to the highest possible level.

I rejoice to know that this co-operative service for, and to, the industry is receiving ever-growing support throughout the country, together with the equally necessary and valuable work of the National Gas Council in the fields of administration and legislation, and of the Institution of Gas Engineers in the direction of technical research of the highest order. The crying need in all walks of national life to-day is the spirit of co-operation and mutual helpfulness, rather than of antagonism and individualistic selfishness—the spirit which seeks for points of agreeement rather than disagreement, for harmony rather than discord. It is because I see evidence of the steady growth of such a co-operative spirit in the gas industry, and because the "B.C.G.A." is, first and last, the embodiment of that spirit, that I view with great hopefulness the prospects of that industry and am proud to have been the President of that Association.

Mr. D. Milne Watson (the President of the National Gas Council) proposed a very hearty vote of thanks to the President for his address. There was no man that he knew in the industry who was more interested in his work for gas than Sir George Davies, and it was a particular pleasure to him to be in Bristol when Sir George occupied the chair as President. Sir George was unremitting in his attention to his duty as a gas director, and was constantly going to London to deal with the affairs of the Association; so that it was splendid for the members to return the compliment and come to Bristol. He considered it was a very good thing for them to hold conferences outside London. There was a tendency to imagine that everything was done in London, and the holding of conferences in other great cities taught Londoners they were not the only people in the world, and they were able to see what could be done in other great cities. The members had listened to a most interesting address, which had struck just the right note. He was glad that there were no apologetics about it. They did not want apologetics in the industry, and were certainly not downhearted, though the "stunters" would prefer to think that they were. The latter would like to imagine that those in the industry were crawling about, fearing their eclipse. He was not such an old gas man as many of those in the room; but he had lived through a good many crises in the gas industry, which had weathered them all, and he did not think that the industry was ever in a more prosperous condition than at present. It was interesting to note that a large number of those who had "stunted" on the therm matter were the people who were always bad payers. They had really thoroughly enjoyed themselves this time. The public had been told to boycott gas. He had taken up the very paper which had said "boycott gas," and had found in another column the words "monstrous charges for electricity." It was also stated that coal had "soared" up in price. He supposed that wood was all that was now left. [Laughter.] It was a very easy thing to lay blame on the therm, because it was something new. Discussing the object of the change-over to the therm, he said that during the war the gas industry was called upon to produce benzole and toluole, and when those products were taken from the gas, the result was that the old standards went. The industry was told not to supply gas of more than 450 B.Th.U. or thereabouts. The thing was to get the benzole and toluole out of the gas, and, as had been said, the industry had saved the country. He had never heard this denied. The result was that when the war was over, nobody knew exactly what gas should be supplied; coal supplies were short, and difficulties had to be faced in all directions. What was to be done? The question of settling a standard of gas was put to the Fuel Research Board, who, very wisely, had said there was no necessity for it, and that it was almost impossible. It could not be said that there was one quality of gas suitable for the whole country—it depended on the quality of the coal, the locality, and the purpose for which the gas was mainly used. The Fuel Research Board very rightly said that they would not prescribe a definite fuel value for gas throughout the whole country. The therm was adopted; and it became the law of the land, under the Gas Regulation Act. That Act was based upon absolute scientific principles, and the therm was absolutely scientific. It enabled a man to buy exactly what was in the gas. They did not pay the same money for all grades of petrol; and why should they pay the same money for all grades of gas? The right thing to do was to buy on calorific value, or, in other words, on the therm basis, because they were only buying what was useful to them. They did not want the bulk, but the quality of the gas. It was so simple, because a therm was a therm all the world over. The price was fixed according to local conditions; also, the gas was tested by a calorimeter, which would record its quality accurately. Therefore, the consumer not only bought what he wanted, but was also assured of getting it. In addition, he was further protected by the fact that the undertakings had to provide apparatus suitable for burning the gas; so that the Act was entirely in his favour. Yet the consumer had turned his rage on the industry. Why? Simply because last June was a very cold month, and the previous June was a very warm one. In June, 1921, there was a national coal strike, and in June, 1922, there was not. In June, 1921, the gas undertakings sent out circulars asking consumers to limit their consumption of gas. The average temperature of the two periods differed by something like 7°. To his Company (the Gas Light

and Coke Company) a decrease of 1° in the temperature—by a rough and ready rule—meant an increased consumption of about a million c.ft. of gas; so that if they remembered that for months in 1921 the temperature was 7° higher than in 1922, they would realize what an enormous amount more money was paid for gas in the latter. The books of the Company showed that there was only one month in 1921 in which there was not a decrease in consumption; and this year there was not a month in which there was not an increase. But the public were amazingly ignorant. He remembered that a doctor had written some time ago and said that he did not like the system of charging by the therm, and wished to go back to the old kind of gas, adding that at present all his eggs were hard-boiled. [Laughter.] Really, what were they to do? Another letter from a clergyman had been produced in one of their principal papers, to the effect that for the spring quarter of 1921 the gas bill had been 13s., but was now £5 17s. 6d., and this must be due to the therm. Fancy a note like that being printed at all! This was what the public were pleased to think. When people got something new, they distrusted it and disliked it. The cure would be greater experience, which he supposed the consumers were getting now. But, speaking to a body of gas men, there was no reason to be downhearted, because business now was better than before; and he had good reason to believe that the stunt, while it might have done some good possibly to their friends and rivals, the electricians, had done even more good to the gas industry. Gas was on everybody's tongue; and he believed that there was a silver lining to this particular cloud, and that they of the industry would find gas more popular in the future—largely due to the controversy which had been raging in the Press.

Councillor W. Cundiff (the Lord Mayor Elect of Manchester), in seconding the vote of thanks, expressed regret at the unavoidable absence of Sir William Kay (the Chairman of the Manchester Gas Committee). In his absence, he had very great pleasure in seconding the vote of thanks. They had all listened to a most interesting address. He had always been led to believe that in 1806 gas was used in Manchester for the first time. Alderman Phillips, of Salford, claimed that Salford used gas first; and he did not know where they would get at the truth. He agreed with the remarks made by the President as to the propaganda work of the Association, and regretted that 16 p.ct. of the gas undertakings in the country were outside that body. He hoped that, if there were gentlemen present representing those undertakings, they would see their way to come into the fold.

The vote of thanks having been accorded with acclamation,

The President briefly returned thanks.

Annual Report and Local Sales Development.

The annual report and statement of accounts, and also a paper by Mr. J. C. Walker (the Secretary of the Association) on "The B.C.G.A. Service in Relation to Local Sales Development" were then considered in private.

The New President.

It was announced that Alderman J. H. Lloyd, of Birmingham, had been elected President for the ensuing year; and Messrs. Cash, Stone, & Co. were re-elected Auditors.

Alderman Lloyd invited the Association to hold their 1923 conference in Birmingham.

A Luncheon.

The members were then invited by the Bristol Gas Company to a light luncheon in the hall adjoining the Lecture Theatre.

[Owing to extreme pressure on our columns we are compelled to divide our report, holding-over the Papers, discussions, and other business for subsequent issues.]

MIDLAND JUNIOR GAS ASSOCIATION.

Opening Meeting.

The opening meeting of the session of the Midland Junior Gas Association was held at the Council House, Birmingham, on Thursday of last week. There was a large attendance of members. Mr. W. J. Pickering (Nechells, Birmingham), a former President, occupied the chair in the unavoidable absence of the retiring President, Mr. W. Batt, of Newcastle-on-Tyne.

Mr. H. R. Hems (Hon. Secretary) read letters of apology from Mr. B. W. Smith, of Walsall, and Mr. H. E. Copp, of the British Gas Light Company.

The Chairman referred with regret to the illness of Mr. W. H. Reed, Warwick; and the meeting agreed that a letter should be sent to him wishing him a speedy recovery. He then proceeded to induct Mr. C. F. W. Rendle (Redditch) as President, pointing out that he had been a member of the Association since its early days. He had read at least one paper before the members, while he had with much ability contributed to the discussions. He felt confident that under Mr. Rendle's leadership they would have a successful session, and that the members would give him their whole-hearted support.

Mr. Rendle (who was loudly applauded on taking the chair), addressing the members, observed that his first duty was to propose a vote of thanks to Mr. Batt, the retiring President, whose absence they regretted. Shortly after Mr. Batt's election to that position, he received his appointment at Newcastle, and naturally the distance between that city and Birmingham made the duties somewhat exacting. The real interest of Mr. Batt in the work of the Association was shown by his attendances at their meetings. [Hear, hear.]

The resolution was seconded by Mr. L. H. Thomas (Nechells), who also bore testimony to Mr. Batt's interest in the Association and its work.

The vote of thanks was passed with enthusiasm.

Mr. Rendle then delivered the following

PRESIDENTIAL ADDRESS.

Rather than discourse on any particular topic, I propose to take you in thought, if you will, through a broad range of the many phases of our industry, in the light of existing conditions; and if in so doing you find some material for fruitful discussion or inception of research, be it however humble, then I shall be contented that I have not altogether wasted your time or patience. The nature of some matters which I shall thus review may be criticized as beyond the scope of consideration by younger members of our profession, to which my reply would be that for the very reason of their unfamiliarity, if such exists, are they matters of importance to the younger man's training, and should not be left for him, untutored in their principles, to acquire for himself in the hard, if efficient, school of experience.

TITLE, SCOPE OF ACTIVITIES, AND EDUCATION.

Adverse criticism has long been levelled at the title of our Association and its kindred, and has met with a measure of not altogether unmerited support because, for one reason among others, we cater for other than our welcomed juniors, and do not debar those who, having passed from junior to senior office in the profession, but invariably finding our proceedings sufficiently attractive and instructive, seek to remain our members. A disuse of the word "junior," therefore, might conceivably bring beneficial results, if only to dispel the illusion—which I believe must occasionally exist here and there—that after all we are juniors and that our ideas must be measured in similar terms. In my opinion, however, the greatest need for revision is not so much in the title as in the scope of activities pursued by our Junior Associations.

We exist to-day solely for the very excellent and praiseworthy transference of knowledge and experience among ourselves by means of our lectures, discussions, and visits to manufacturing centres. But do we not feel that we may possess some latent characteristics of value to the industry at large, which may be profitably used by linking us more tangibly to our higher authorities, and so render us less of isolated units than we are? The Joint Council forms a step in this direction; and its excellent work in connection with the new education scheme for gas engineers will, I hope, be fully recognized soon. In my opinion, however, a closer bond than this would be both desirable to us and beneficial to the industry. We do not come into close contact with our Senior Associations, whose activities would appear to be now more involved, and rightly so, in the administration and moulding to local conditions of the primary efforts of our great centralized organizations, leaving us, as it were, to carry-on with our technical work. If this, then, be the case, may we not find in it material for a more appropriate title? At all events, whatever our name be, let us be undeviating in our efforts to make our transactions by their merit enjoy still higher reputation.

The mention of education brings one to a realization of the opportuneness of the new scheme which doubtless will be put into operation before the Gas Regulation Act has lost its newness, for this enactment has changed in a marked degree many of the lines of thought which a student of gas engineering—and I use the term in its broadest sense—must pursue to obtain success in the future. Moreover, the new education scheme, by raising our professional status, will materially assist one of the principal objects of the Gas Regulation Act—viz., the stabilization of gas securities and the increase of their attractiveness to the investing public. In the accomplishment of this aim we shall be inspired to further our individual and collective endeavour to maintain this tone of the industry.

ORGANIZATIONS.

To resume our review, and in particular, for a moment, to observe the nature of the various centralized organizations responsible for the control and welfare of our industrial development, we recognize the guardians of what may be termed our political interests—the negotiators of our labour problems, the medium through which the sale of our principal product is prompted or maintained, and the co-operative agents who care for our liquid bye-products—but when we start with coal at the beginning of our process and coke arrives at the end of it, we are left severely to our individual resources.

Collective coal buying is no new topic—a procedure which obviously would be attended by endless difficulty; but a standard of a nature such as (say) a schedule of qualities expressed in terms best calculated to denote comparative all-round values of coals as gas and bye-product producing materials, compatible with a basic sliding-scale of prices at the pit-head, might conceivably tend towards that highly desirable end—a smaller percentage of inert matter than is often, even now, received in gas-making coals. The whole question is problematical and complicated, none the less so because of the peculiar suitability of some classes of coal, regardless of their gas-producing qualities alone, for certain systems of carbonization; but the subject, in my opinion, merits attention with the object of effecting the improvement of existing practice.

With regard to surplus coke, and the present haphazard and

injudicious method of its disposal, surely a more desirable end is easier of accomplishment than in the case of coal! As long as some gas-works produce more coke than suffices for their internal and local requirements, it is evident that, barring wholesale and universal export, the surplus will be disposed of in other districts, doubtless within areas served by other gas undertakings, and possibly, owing to the vagaries of selling prices, areas with their own coke disposal problems to contend with. This "dumping" at cut prices is often accomplished in direct opposition to the express desire of the gas authorities primarily responsible; but a coke heap has an awkward trait of growing during the night, and ominously large stocks hamper works routine operations and are not always good investments. Consequently, one finds it difficult to criticize sales which are unattended by scrupulous questioning as to the ultimate destination of the coke, even were that always precisely known to the actual buyer.

It is not the camaraderie of neighbouring gas undertakings which is lacking in this respect, for often mutual arrangements are made between such for the withholding, in the absence of due consent, of coke sales in each other's area of supply. But such a course is merely a local alleviation of the ill; and it is the whole principle which, in my opinion, calls for revision. I suggest that properly constituted regional committees, representing suitably grouped districts, and provided with the necessary data and statistics, could equitably deal with the pooled surplus coke from gas undertakings within their areas in their best markets; and such a course might reasonably be expected to operate to the mutual and not inappreciable advantage of all the undertakings concerned. Interaction between various of the committees might often be necessary at certain periods; but this should present no serious working difficulty, and it is possible that some such scheme as that which I have briefly outlined could be inaugurated by a branch of one of the existing centralized organizations without necessarily establishing new machinery for its operation.

WORKS PLANT.

The all-important consideration of modern tendencies in the design and construction of gas-works plant invariably turns the thoughts at once to carbonizing plant; but this vast subject alone is sufficient to demand one's entire study for an age, and more time than can well be devoted here for other than brief discussion. Undoubtedly the exigencies of the Gas Regulation Act render necessary the production of gas of constant quality—and for each specific case such a quality as will best suit the peculiarities of local methods of consumption. The plant which complies with this condition, and at the same time permits of the maximum production of heat units per unit weight of coal used, would appear to be the ideal as far as these two factors are concerned; but the latter desideratum is not attainable over wide ranges of gas quality for every type of carbonizing plant. In order, therefore, to make the best use of existing systems which are deficient in this flexibility, there may be call for some variation of one of the factors—that which is least prejudicial to the economics of the undertaking's whole business.

Without venturing to discuss the relative merits of various carbonizing systems and practices, I have to mention that I regard horizontal retorting with efficient labour-saving accessories as possessing potentialities in excess of those with which it has become fashionable to credit it; and those of you in junior rank who, as seniors in the future, may be called upon to decide the retention or abolition of existing horizontals on smaller works may be not unwisely advised to consider, apart from factors outside the scope of these remarks, whether they are being operated to their best advantage, or merely treated somewhat as domestic fire-grates.

Horizontal retorting, although often regarded by the average junior assistant as the simplest of operations and devoid of any uninvestigated principles, bristles with a mass of detail which must be thoroughly observed, investigated, and experimented with if the best results are to be obtained. Constancy of atmospheric conditions and fuel depth in producers; the maintenance of regular combustion chamber temperatures; the appropriateness of the latter for the type and average size of coal used; the judicious distribution of charges having regard to the fact, among others, that it is only the adequately heated portion of the retort in which coal is distilled successfully; the regularity of coal throughput; the methodical lay-out of the gas and tar off-take system, and the very necessary cleanliness of the same; and, not the least of all, good governing of pressure conditions in the gas off-takes, are points, elementary in character if you will, which call for adoption and rigid adherence in the quest for good working results. Each in itself offers scope for investigation and regular work of a nature eminently attractive and instructive to works juniors and capable of treatment by them. In such investigations, as in most cases of humble works research involving the use of comparative data, graphic representation of results undoubtedly admits of a clearer conception of conditions than tabulated data, and often plays the part of a scientific detective in revealing causes of conditions. Moreover, the use of recording instruments, wherever practicable, conveys a more correct and reliable impression than a host of intermittent observations. Particularly have I found graphic representation helpful in such work as the attempt to secure constancy of calorific value of the gas stream from horizontal retorts; the plotted graphs revealing with precision the causes of fluctuations which at one time existed when working on accepted normal lines.

The question of diluent gases is a vexed one, dependent as it is upon a multitude of considerations and upon conditions which vary from one locality to another. The value of a separate water-gas plant, if for none other than stand-by purposes (for which it is so admirably adapted), bids fair to secure its retention as an essential component of gas-works plant for as long as one dare look into the future. The utilization of waste heat at all times merits consideration, and is invariably a profitable procedure in connection with our works' processes; but, as in all cases involving financial outlay, the profit and loss account of such recovery should first be carefully studied in the light of one's individual conditions.

Before leaving the subject of gas-making plant, mention must be made of refractories, of which we, in whose business these materials play such a fundamental part, appear to know singularly little. We await with interest the result of further research in its effect on the existing standard specifications, which are at present under revision; and with the adoption of suitable working standards, it will remain for us to see that we purchase refractories to specification.

As to general works plant, one regards with satisfaction the tendency to increase efficiency and so reduce the bulk of the unit and the power absorbed by it, although such remarks, one regrets, do not apply to-day to dry purification systems, nor to station meters. In the case of the latter, most of us evince a conservative favour for positive measuring appliances, although many of the inferential types possess the distinct advantage of showing a continuous record of the rate of flow, without which the computation of total heat-unit production—now an important figure—is a mere approximation.

While stating that the *pros* and *cons* of wet purification would appear to be too little known in an industry so old, I offer no criticism of iron oxide purification, but would plead for the cultivation on the part of junior works' assistants of experience in the effects of variations in the physical condition of the purifying material, in the arrangement of layers in the boxes, and in the mass of material per unit of gas flow, as against, at the outset of their career, regarding dry purifiers just as occasional dumping grounds for skip-loads of brownish coloured material. Dry purification may be operated at a low cost; and the merits of disintegrating machines for fouled oxide and of accessory labour-saving systems offer scope for remunerative study. One regrets that the complete elimination of those bugbears of many forms of domestic gas consumption, "sulphur compounds other than H_2S," is not as readily and economically capable of accomplishment at small works; and one trusts that the subject will invite the further attention of our chemists in the near future.

Distribution of power to the scattered units of a gas-works plays an important part in the duties of a works engineer. Except in the cases of large works, which call for power adequate to permit of the installation of steam-raising plant at the various points of power consumption, electricity derived from the works generators—preferably gas-engine driven for reasons of policy if for no others—has claims to more economical power distribution than has steam conveyed through long straggling pipe lines, with the attendant thermal losses and upkeep charges. It is decidedly important, however, to keep a good load factor which influentially affects generating costs; and the size of generating units should therefore be chosen with discretion. In improving electrical load factors, caution should be exercised lest Peter be robbed to pay Paul, in the sense, for example, that it might conceivably be less profitable to be unscrupulous in the idle running, at intervals, of driven plant—crushers, elevators, conveyors, and the like—than to replace an inefficient prime mover of another type by a motor. The advocacy of seeking to establish the self-supporting nature of gas-works practice, especially with regard to the working-up of bye products, is influenced not so much by differing schools of thought as by local conditions in each case. This doubtless accounts for the existing lack of uniformity of bye-product practice. But as long as oxide purification remains, the working-up of spent oxide at gas-works—in view of our demand for sulphuric acid—would appear to possess possibilities worthy of attention by those of us competent to deal with the matter.

EFFICIENCIES.

A student of gas engineering to-day should recognize more keenly than his predecessors were called upon to do in student days that its principles must go hand-in-hand with efficiency. The mechanical, chemical, and thermal efficiencies of all components of works plant and their functioning are fundamentally vital to successful working; and herein, perhaps, lies the scope for most of the work which juniors on gas works are called upon to perform. Losses of mechanical efficiency may have the simplest origin; and, consequently, no detail of the machine or installation under review should be ignored as insignificant in its effect without due investigation. Thorough attention to detail need never be irksome if once proved to have a profitable outcome. Repair at the correct stage of wear, effective methods of continuous lubrication, and a judicious choice of type of lubricant are very necessary, though sometimes neglected, factors contributory to the efficiency of machinery; and a tendency to avoid inspection of relatively inaccessible parts with the "Oh! it is oiled once a week so it must be O.K." excuse should be obliterated from the minds of juniors in charge of machinery installations.

The maintenance of thermal efficiencies is significant of the bond between the chemist and the engineer, and, in the case of combustion systems, calls for partial gas analysis of a simple order. Here, again, are the advantages of continuous records

evident. To state the necessity for ample chemical information on a gas-works is to risk a platitude; but it may not be unnecessary to realize that laboratory results are of little moment, unless they are acted upon in the appropriate works operations, thus completing the chain of efficient control. In this connection the duties of a junior chemist may be made the more interesting, and his efforts given added zeal, if the economical effects of his laboratory experiments upon the works routine be made known to him. A similar reasoning may not unwisely be applied in a modified form to dealings between works superintendents and the humbler classes of labour. Minor responsibilities conferred and confidences sought, even with the unskilled worker, constitute a policy which does much in securing amicable relationship between employer and employee.

Calorimetry is naturally more strikingly prominent than ever in gas-works practice; and here, again, a thorough appreciation of detail characterizes the securing of reliable results. To be of service, calorimetry must be as correct as is to be obtained. Consequently, one must maintain the constancy of those many controllable conditions in the testing-room, in the sampling, and in the actual use of the instruments upon which the value for comparison of successive results depends. My previous remarks as to the value attaching to the use of continuous records apply equally to calorimetry; and here is call for frequent and careful checking of recording with standard instruments in view of the importance of the results. The subject of calorimetry is as vast as its importance to us, and we look forward to the pleasure of Mr. Wood's paper on calorimeters during this session.

COSTING AND WAGES ANALYSIS.

Ranking equally in importance with the various efficiencies enumerated above, stands what may be termed the financial efficiency of the same plant and works operations to which they are applicable; and since this topic is usually not so familiar to the junior, I may perhaps be excused for prolonging my remarks by alluding to some personal experiences affecting this issue. The whole subject is synonymous with that of costing, and interdependent with it is wages analysis; for in the absence of either or both of these, the financial efficiency of works operations is impossible of attainment, and their economics may well be chaotic. Moreover, the matter must be treated thoroughly. A costing system half-heartedly operated is worse than none at all; for though one may rely and act upon its findings, they are inevitably misleading and bear conflicting results.

To deal with wages analysis, each worker, of course, records his total time on a register, and the allocation in the case of unskilled workers and shift men is made by the shift works foremen who, best of all, know precise details of the same, for they themselves allocate such workers duties. This allocation is entered upon the daily time sheets, which are ruled vertically into columns representing the various duties undertaken by these workers (here, naturally, is scope for alteration and for addition to suit individual works requirements), and horizontally for the names of the workers. From the particulars on these sheets the wages clerk is enabled to enter the appropriate totals under each analyzed heading on the pay sheet, which of course contains, in addition, data regarding each worker's weekly wage. Skilled men's time, fitters, blacksmiths, retort-setters, and the like, is dealt with through the costing system proper. For each job an instruction sheet is issued by a works official; and it bears details of the nature of the work to be done, the name of the artizan, and instructions to obtain the necessary materials from store. The artizan, upon producing this instruction to the storekeeper, is given a job sheet bearing details of the material issued, together with the necessary materials; and upon this sheet, on the completion of the job, the worker records particulars of the time he has spent on it. The sheet, together with unused material, is then returned to the storekeeper, who costs the material actually used and the worker's time to the appropriate analysis column in the cost book opposite dated details descriptive of the job.

In this manner there is obtained at the end of any period (without necessitating waiting until the end of a half-yearly or other normal accounting period) the complete cost of all works operations analyzed to their respective headings under either capital or repairs and maintenance accounts. It is essential that such a system be combined with efficient storekeeping; and the utility of the stores requisition, inquiry, and order forms is obvious. The stock cards are perhaps individually worthy of note, in that they at all times form a ready means of rapidly determining the extent and money value of stocks held, both of each article and in total. Their use in conjunction with the job sheets will be obvious to you. Moreover, the provision of a minimum stock figure enables the storekeeper to requisition for replenishments in time for the use of the inquiry forms to be of service.

One direct channel through which a works engineer may seek to effect economies is revealed by the monthly summary of wages analysis appearing on the gas-making statistics sheet; each analyzed wages item, obtained from the pay sheets, being accompanied by its representation per therm. Provision is made not only for the wages costs for the current month, but for a brought-forward total for the preceding portion of the current half year, and for a carry-forward total for the whole of the elapsed portion of the current half year to date. Thus is one enabled to compare the current month's wages costs with the former existing average, for each operation, and undue variations which are not accounted for by unavoidable contingencies—such as, for example, a serious fluctuation in output of gas when employing a minimum staff of shift-workers—will reveal the necessity for investigation and bring subsequent economy. I have found this phase of the system a surprisingly efficient incentive to the judicious allocation of labour; and the data, furthermore, denotes with accuracy the comparative correctness of the balance between the labour complement and the existing output from the works.

I have complete confidence in the value of the whole system, and in its superiority to the haphazard method by which, in the absence of such information as the system provides, a works may be either staffed or over-staffed. It is questionable whether a more frequent summary of wages analysis appearing on the statistics sheet is desirable; but this is largely a matter of opinion.

The statistics sheet itself calls for little attention, save that its obvious feature is to form a self-contained record of most works data of importance, and it is naturally subject to modification and amplification to suit peculiar requirements.

All this costing and compilation of analyses and summaries calls for office organization; and here I cannot too strongly emphasize my conviction of the paramount importance of close co-operation between the works, the distribution, and the secretarial staffs, if all-round efficiency be aimed at. The scope of each overlaps that of the others in some part of its curriculum; and it is in these overlaps, and often extensively beyond them, that mutual action is not only justified but desirable. It is often argued by the adherents of conservatism that one may over-systematize; and such people usually proceed to avoid system entirely. I agree that over-systematization may easily be a charge rather than effect economy; but it is merely by the exercise of common-sense reasoning that one may at any time draw the appropriate dividing line in the review of one's own condition, and system is certainly profitable.

DISTRIBUTION.

For purposes of the equitable sharing of the interests of works and distribution matters in our Association I am, I believe, among those regarded as works members; and I have therefore, and from no other motive, confined my remarks principally to works matters. In my professional capacity I fully realize the ever-growing importance of distribution staffs to the industry. More than ever does business require to be sought, and the scope for the use of our principal product, with its far-reaching possibilities, calls for highly-trained officials with extensive knowledge of the widespread applications for use of gaseous fuel to control distribution matters. It is thought, in fact, doubtless by many, that the time has arrived to departmentalize distribution control in as far as it applies to the industrial uses of gas as distinct from domestic forms of consumption; and this opinion has been expressed previously in our transactions. I speak obviously of the smaller undertakings; for in large centres the practice is already established, as will be seen in the Industrial Demonstration Rooms of the Birmingham Gas Department. If it is desirable in the case of our smaller undertakings, each financially incapable of putting it into effect, then it resolves itself into a case for co-operative action—an industrial sales engineer (call him what you will) for a group of neighbouring undertakings or districts. Much business is at the moment undeniably lost because existing officials have not the time at their disposal in addition to that demanded by necessary routine, nor, in cases, the specialized knowledge of this relatively new branch of gas consumption, to devote to the interests of this increasingly important phase of our distribution affairs.

Mr. Wood, in his paper to us on "The Thermal Efficiency of the Use of Gas," a few years ago, reminded us that the efficiency of the use of gas was a combined efficiency of burner and fuel. This implies a wealth of meaning which requires elucidation by further research before we may intelligibly appreciate the factors governing the comparative suitability of different grades or composition of town gas for efficient consumption. I hope that we may be able to discuss this matter somewhat during the session in connection with those papers whose titles are not irrelevant to it. The exigencies of the Gas Regulation Act as affecting the maintenance of specified pressures in our distributory systems direct one's thoughts to the prominence of the subject of naphthalene, which may now call for increased attention by juniors in both works and distribution departments; and a study by them of the comparative advantages, in all issues, of the removal at the works of naphthalene from town gas, and the alleviation of its effects on the district by the use of liquid hydrocarbon "carriers," may not prove wasted effort.

In conclusion, I trust that from the veriest tyro among juniors to the experienced senior among our members you will all endeavour to make the ensuing session successful, both in your professional spheres and in your connection with our Association. No small means to the latter aim will be rendered if you will forsake the ranks of the impassive listener and swell the number of those who enter into reasoned discussion of the subject-matter of our papers.

VOTE OF THANKS.

On the motion of Mr. THOMAS, seconded by Mr. H. CLARK (Derby), a hearty vote of thanks was passed to the President for his address. Reference was made to its high standard and comprehensiveness.

The PRESIDENT briefly acknowledged the vote.

Later the members viewed the new Industrial Demonstration Rooms recently opened by the Birmingham Gas Department. Dr. C. M. Walter conducted the party.

EASTERN COUNTIES GAS MANAGERS' ASSOCIATION.

HALF-YEARLY MEETING AT NORWICH.

There was an unusually large muster of members last Thursday at Norwich, to take part in a day's proceedings which were confidently expected to be enjoyable and instructive, and which in the event came fully up to anticipations in both respects. It was a busy day for Mr. Thomas Glover, C.B.E., M.Inst.C.E., who, with the British Gas Light Company, richly deserved all the thanks that were voiced by the visitors. The welcome was of the warmest; and in addition to the performance of the duties of host, the Association were much indebted to Mr. Glover—an indebtedness which the Hon. Secretary and Treasurer (Mr. W. H. Mainwaring) acknowledged in the course of the meeting—for having, when asked to do so, readily stepped in to fill a gap in the programme.

AT THE GAS-WORKS.

The meeting place was the Bishop Bridge works of the British Gas Light Company; and here the members—headed by the President of the Association, Mr. H. G. Ruggles, of Leighton Buzzard—were welcomed by Mr. Thomas Glover (the Engineer), who told them how sorry Mr. Henry Woodall, (the Chairman of the Company), was at his inability to be present. A short time was spent in inspecting these works, where the gas is exhausted, purified, stored, and distributed, and then a move was made to the St. Martin-at-Palace works, half-a-mile away, which is the manufacturing station of the Company. Here nearly a couple of hours were profitably passed under the guidance of Mr. Glover, who appeared to be full of "wrinkles"—of the right kind—and various assistants, including Mr. Donald Cameron, Mr. H. Edgar Bryant, Mr. Harston, Mr. Weston, and Mr. Wayte. Much information was also given by Mr. Samuel Glover, Alderman F. J. West, and Mr. Ronald Glover.

This well-designed and substantially built manufacturing station is now divided into two complete sections. There is, in the first place, the section which resulted from a reconstruction scheme of nearly twenty years ago, when there was put into operation what Mr. Glover has ever since regarded as the "new" horizontal retort-house, until now he is compelled to refer to it as the "old" house, by the erection of a magnificent house containing ten beds of eight Glover-West vertical retorts in a setting—which is the main feature of the second section. By the scheme of reconstruction carried out in 1903-4, the manufacturing capacity (practically on the same area of land) was more than doubled; and the new scheme provides, when completed, for again doubling the output. Particulars of both schemes will be found in the synopsis of a lecture delivered by Mr. Glover at the subsequent business meeting.

It was noted that Mr. Glover favours the storage of coke under cover, and that he has a preference for ferro-concrete hoppers. In the horizontal house, the members were able to see a setting in process of being re-built. What are being employed are not moulded retorts, but all brick, as in this way Mr. Glover finds that he can better select his material. With these retorts a life of 1500 days is often exceeded—this figure being about the average. In the second scrubber are plate-glass windows, which are an advantage, enabling one, as they do, to see how clean is the gas that is passing through. During the tour, Mr. Glover pointed with pride to his benzole and toluole plant, which has done excellent service in connection with the horizontal house.

LUNCHEON.

Subsequently, in the Royal Hotel, a party of nearly a hundred sat down to lunch as the guests of the Chairman and Directors of the British Gas Light Company. This part of the proceedings was rendered additionally enjoyable by the very fine singing of a Glee Party. Mr. Thomas Glover was in the chair.

The CHAIRMAN, after the honouring of the Loyal Toast, said he was sure those present would not like this occasion to pass without his proposing the health of the President of the Eastern Counties Gas Managers' Association, Mr. H. G. Ruggles. They were very pleased to have him with them to respond to the toast, and they were glad to see there the President's respected Chairman, Mr. Robert Richmond, who had welcomed the Association to Leighton Buzzard on more than one occasion, and made things very pleasant for them. In Mr. Ruggles they had a worthy son of a worthy sire. They remembered with great respect his father, who filled the chair that his son now occupied. He asked them all to drink to the health of Mr. Ruggles, and to the continued success of the Association.

Mr. RUGGLES thanked Mr. Glover for the kind words he had spoken in proposing the toast, and the members for the manner in which they had received it. The pleasant duty now devolved upon him of proposing a very hearty vote of thanks to the Chairman and Directors of the British Gas Light Company and to Mr. Glover for their kind invitation to Norwich and the generous hospitality that they had extended to the visitors. The Association must consider itself very fortunate indeed in being able to count Norwich in its district, and it was also to be congratulated upon having such an active member as Mr. Thomas Glover, who was always only too willing to do everything he could to further the interests of the Association. The visit to the gas-works had been extremely interesting, and they were looking forward to an equally enjoyable lecture later on in the afternoon. Thus they would take away with them many happy recollections of the day. They were all particularly sorry that Mr. Henry Woodall had found it impossible to be with them.

The CHAIRMAN, alluding to the audience's keen appreciation of the singing, said he was glad they liked harmony. It was very important to have harmony between gas engineers and their chairmen and directors; and he was happy to say that it existed in the British Gas Light Company, as would be shown by the following letter which he had received from the Chairman:

> Dear Mr. Glover,—I am very sorry I cannot be at Norwich to-morrow, to assist you in entertaining the members of the Eastern Counties Gas Managers' Association. It would have been, as you know, a pleasure to me to meet our friends from the eastern counties, and to have shown them the works which you have designed, and with which the British Gas Light Company are very pleased and satisfied.
>
> I and my colleagues desire you to welcome our guests in our name as well as your own, and wish them a successful meeting. Please express to the members present my great disappointment at not being able to be with the party.
>
> Heartiest good wishes for a thoroughly successful day.
>
> (Signed) HENRY WOODALL.

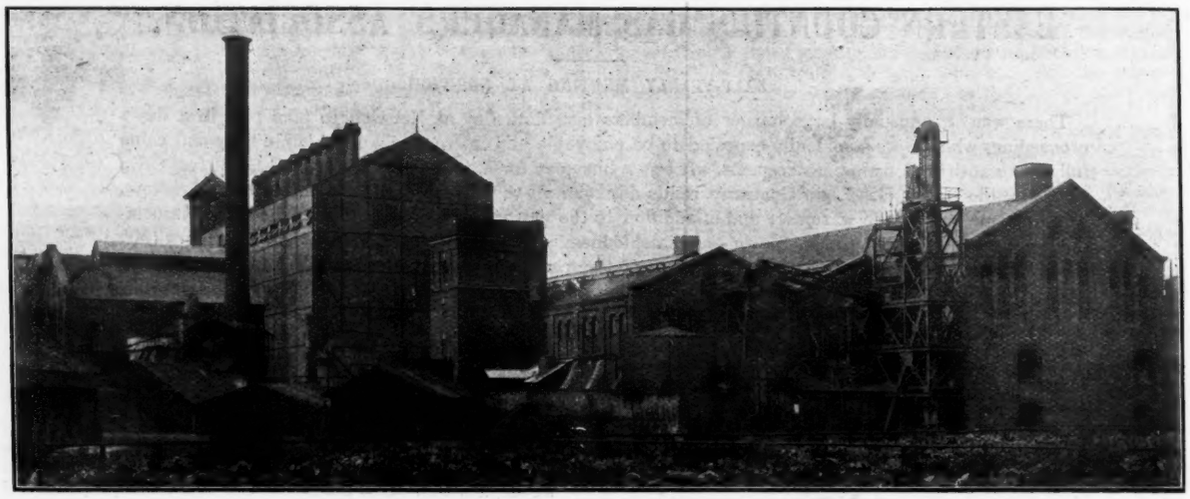
On behalf of the Directors and in his own name, he thanked Mr. Ruggles for the kind words he had spoken, and the members for the enthusiastic way in which they had expressed their appreciation of the welcome that had been extended to them. They had seen the new works that morning in their almost finished condition; but they would see in the lantern slides later on some of the processes that had been gone through. There had been anxious times, but to-day was the day of rejoicing, when they had got their new plant in operation and working satisfactorily. What the visitors had seen would have impressed them with the part the Directors had played in the industry for which they were responsible in Norwich. They had launched out in heavy expenditure in order to give the city that good and reliable supply of gas to which it was entitled, and which the Company were bound by their Acts to furnish. The Company did not find these Acts irksome, because they anticipated matters, and always tried to be in advance of requirements. There had been plenty of evidence of recent years of the importance of a good gas supply. During the coal strike last year, the industry passed through many difficulties; but in the great majority of cases there was no failure of the gas supply—and gas was never so valuable as it was at that period. Many people would have had to go without cooked food (except such as was procurable in tins), if the aid of the gas-stove had not been available. The rôle of the gas industry undoubtedly was that of supplying the most convenient, the cheapest, and the most readily applied fuel; and they were really only at the beginning of things. In spite of all that had been done, there was still a great deal to be accomplished, and the big expenditure that had been incurred was going to be justified by the future demand for gas in Norwich. He spoke with confidence because of his experience in the past. They might feel inclined to say to themselves: "Norwich is doing these things, let us go and do likewise."

Mr. J. TERRACE said they would all wish to drink to the toast of "Kindred Associations," and as they enjoyed that day the pleasure of the presence of the President and some other members of the North of England Association, and probably representatives of other similar bodies, they would like to wish them good health and success in the work they were carrying on. He coupled with the toast the name of Mr. Blundell, of Carlisle, the President of the North of England Association.

Mr. J. E. BLUNDELL remarked that it was a great pleasure to him to be present. He realized clearly that the interchange of thought between the North and the South was a very desirable thing indeed. He personally had come across many things that day which had interested him, and with others it must have been the same. He felt that gas engineers ought to take a lesson from the contractors. The contractors to-day were marching ahead. They were keeping up the progress of the gas industry; and it remained for gas engineers to see that they themselves did not lag behind, but kept to the front by the adoption of modern methods. Gas engineers must believe in their industry, and be enthusiastic about it. One had to believe in one's business; and in the North they did believe in it. If ever any of those present could find time to come up to the North, they would be given a very hearty welcome.

The CHAIRMAN said that among the guests were several of his personal friends and good co-workers connected with the Corporation—the Town Clerk, the City Engineer, the Water Engineer, the Electrical Engineer, and the City Accountant. They were all the best of men and the kindest and most efficient officials; and he asked them to drink heartily to the toast of these Corporation officials, coupled with the names of the Town Clerk (Mr. Arnold H. Miller) and the City Engineer (Mr. A. E. Collins).

Mr. MILLER expressed his pleasure at having seen the works completed by his good friend Mr. Glover. They had heard from Mr. Glover the value of co-operation. Well, in Norwich they tried to work with the Gas Company, and they succeeded very well. At intervals they sent their Accountant along to the Company to see how things were going on, and he came back with glowing accounts of what Mr. Glover was doing. They rejoiced that they had such a competent officer as Mr. Glover as the representative in Norwich of the British Gas Light Company. He hoped Mr. Glover might be spared



ST. MARTIN-AT-PALACE GAS-WORKS SEEN FROM THE RIVER.

for many years to maintain that high position, and to give the citizens that excellent supply of gas which he was giving now.

Mr. COLLINS referred to the troubles in connection with the foundations in bad ground, and declared that the way in which the difficulties had been surmounted by Mr. Glover and his able contractors was exceptionally good. They deserved all credit for it. Two things that had struck him about the new plant were the labour-saving arrangements and the conservation of heat. There was very little heat to be noticed in going round the works.

THE BUSINESS MEETING.

The business meeting was held in the afternoon at the Maid's Head Hotel. Mr. H. G. RUGGLES, of Leighton Buzzard (the retiring President), occupied the chair at the outset, and was later succeeded by Mr. T. F. CANNING, of Southend-on-Sea (the new President).

MINUTES OF LAST MEETING.

The minutes of the last meeting were taken as read, and confirmed; and the receipt was announced of a number of letters of apology for absence.

NEW MEMBERS.

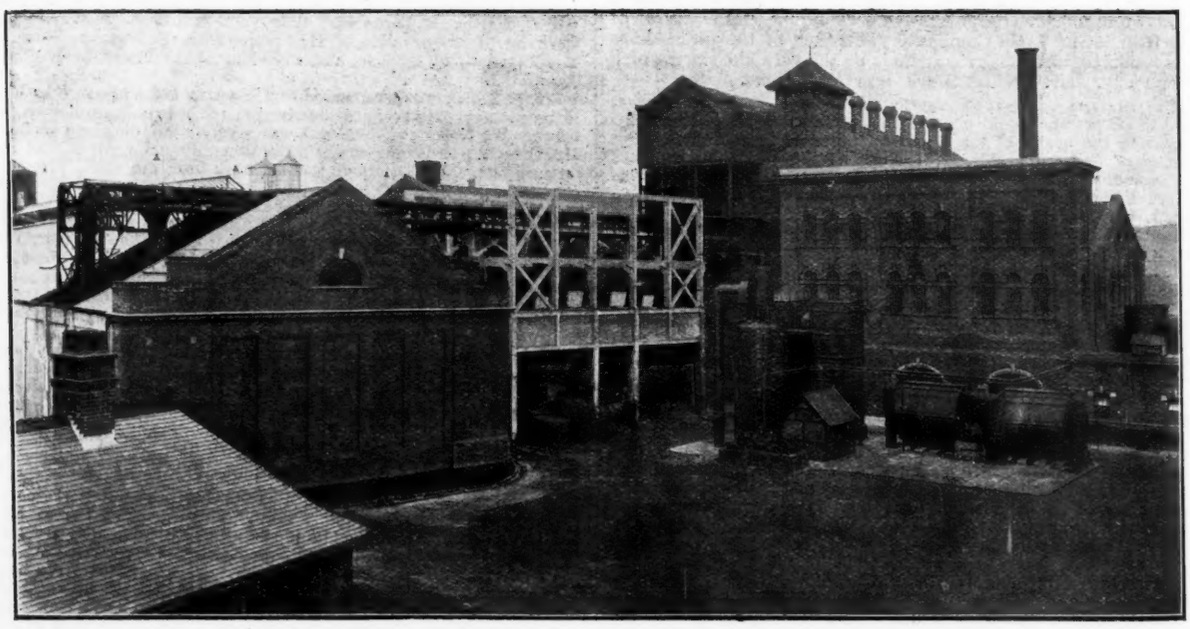
On the proposition of Mr. J. H. TROUGHTON (Newmarket), seconded by Mr. P. D. WALMSLEY (Great Yarmouth), the following new members were elected: Mr. P. J. Channon (Leighton Buzzard), Mr. P. Colyer (Cromer), Mr. W. Grogono (Gas Light and Coke Company, Fulham), Mr. Melville Russell (Elstree), Mr. H. C. Smith (Tottenham), Mr. A. Spencer (Saxmundham), and Mr. E. G. Stewart (Gas Light and Coke Company, Ilford).

THE NEW PRESIDENT.

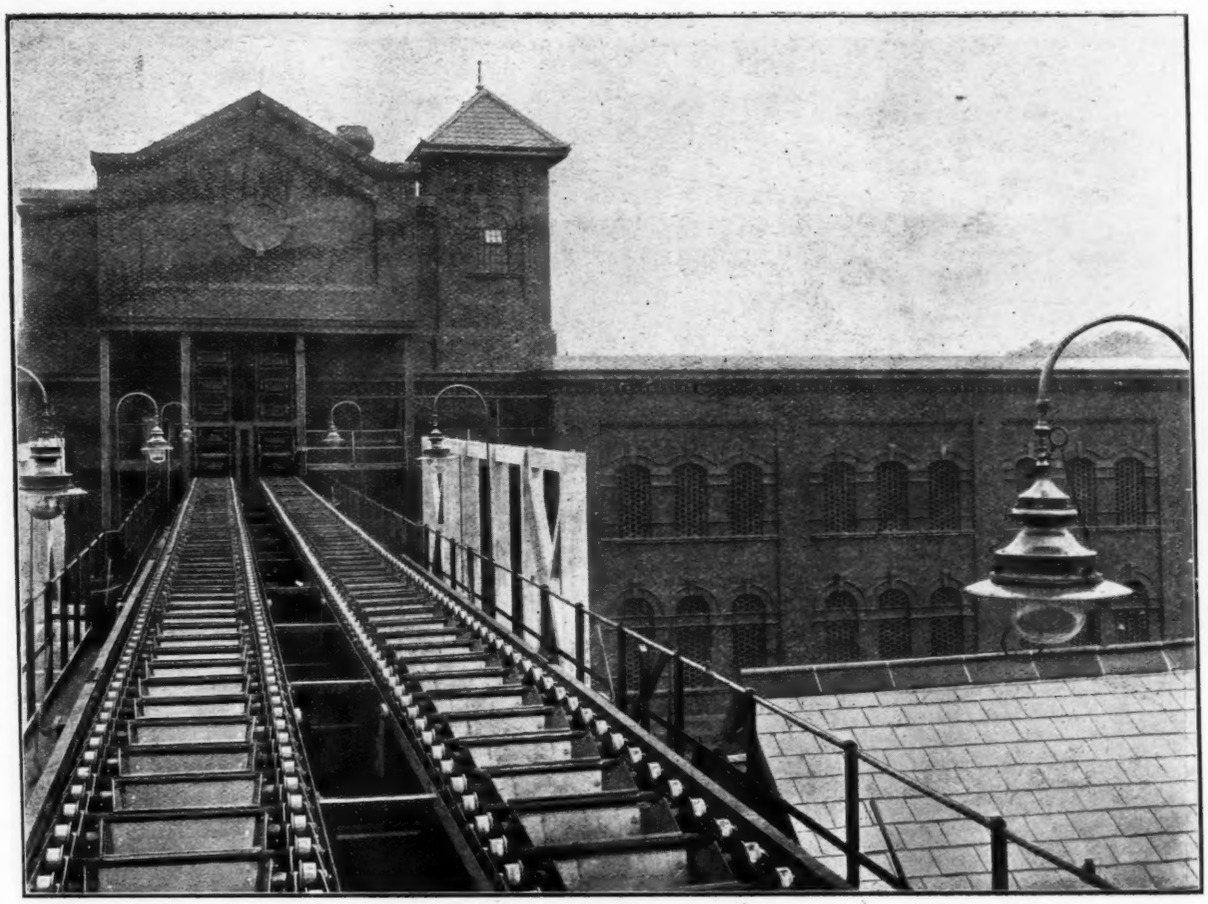
Mr. RUGGLES said the next item on the agenda was the induction of the new President. It was now time for him to vacate the chair, and ask his successor, Mr. T. F. Canning, of Southend, to take office. Though Mr. Canning had not been a member of the Association for a great number of years, from what the members had seen of the work that he had done they were confident he would carry out the duties of President in a creditable manner to himself, and with satisfaction to the Association. He would like to take this opportunity of thanking most heartily the Hon. Secretary and the Committee for the able support they had accorded him during his year of office. Nobody knew until becoming President the amount of work that was done by the Secretary. On behalf of the members, he wished Mr. Canning a very happy year of office.

THE PAST-PRESIDENT'S MEDAL.

Mr. CANNING then took the chair, amid hearty applause, and in thanking the members for their kind reception said he could not help feeling that he was more or less of a usurper. His arrival in the eastern counties was comparatively recent, for it was only some four years ago that he went to Southend. However, the cordiality of his welcome to the ranks of the Association could not have been exceeded, and in every way they had made him feel at home. Mr. Ruggles was so well known to them that his name was a household word. It was always hard to follow a good man, and he would have difficulty in following Mr. Ruggles, who had carried out the duties in so excellent a manner. His next duty was a very pleasant one indeed—to present to Mr. Ruggles the Past-President's Medal. This medal was a mark of the esteem of the members for the work that Mr. Ruggles had done as their President during the past twelve months. He hoped the recipient would live many years to enjoy the possession of the medal and the happy memories it would recall as time went by. He coupled with the presentation a hearty vote of thanks to Mr. Ruggles for his services, and this was cordially agreed to.



ST. MARTIN-AT-PALACE GAS-WORKS—A GENERAL VIEW OF THE EXTENSIONS.



WEST'S LIP-BUCKET CONVEYORS.

Mr. Ruggles, in acknowledgment, said the medal would always remind him of a very happy year.

The President remarked that they now came to the feature of the afternoon's proceedings. He would call upon Mr. Glover.

Gas-Works Reconstruction at Norwich.

Mr. Thomas Glover then, with the aid of a large number of first-rate lantern slides, gave a lecture on the two reconstruction schemes at Norwich. A synopsis of the lecture (which was followed with keen interest) will be found on pp. 240-4 of this issue.

It was pointed out by the lecturer that difficulty in securing good foundations is always experienced when putting up new buildings at these works. The ground is unstable, there being water to within a few feet of the surface. It was therefore determined in connection with the latest retort-house to make use of reinforced concrete piles, and the "Simplex" system was selected. In this system, a heavy withdrawable steel tube, with a hinged point, is driven into the ground to the desired depth, and the reinforcement and concrete are then placed in the tube, which thus becomes a mould. The hinged point remains closed while being driven, but on withdrawing the tube, the two halves of the jaw open to the full diameter of the tube, and allow the reinforced concrete to remain in the ground. The piles were driven in groups of five. The groups are capped with reinforced concrete, and on them the stanchions are placed. It is by means of this interesting method that the new retort-house has been erected on a very questionable site.

Mr. Glover remarked upon the speed with which the 1903-4 reconstruction scheme was carried out, and in showing the horizontal retorts set in five tiers pointed out that the advantage of this plan was that it secured a big make on a small area. With these retorts in this house, the inerts average no more than from about 12 to 14 p.ct. For above-ground tar and liquor storage tanks, he recommends ferro-concrete tops, and not steel. As to the reinforced coke hoppers, steel ones could have been erected in a quarter the time, but they would have had less than a quarter the life that he is expecting from the ferro-concrete hoppers. A little more money was spent on the buildings than bare necessity demanded, so as to get a good appearance. As Mr. Glover said, the extra cost is not much, and it is a lasting joy to those who have to look at the buildings day by day. For gas companies to act in this way is a good example of what should be done for public amenities.

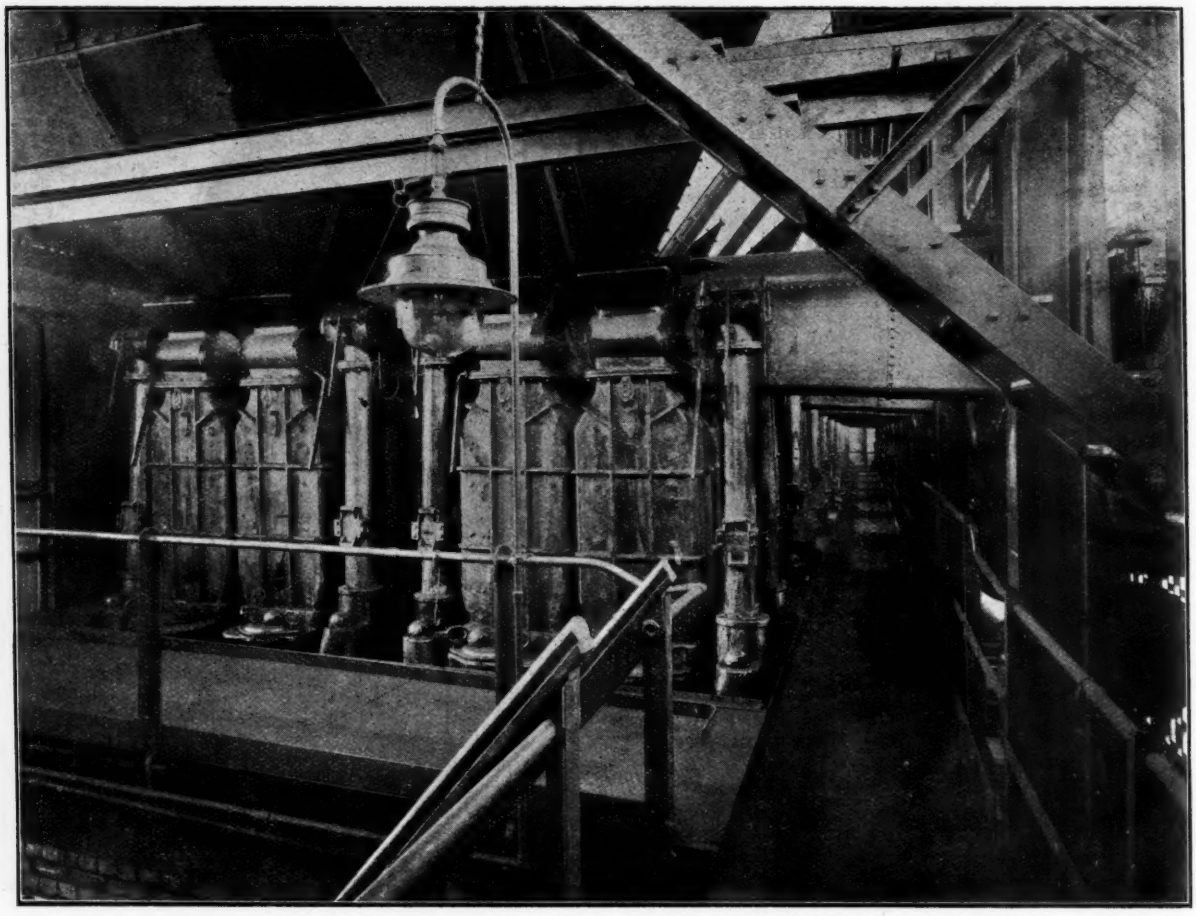
The weighbridge plates are covered with tar material, which renders them silent in use, and so is a great advantage. The Company have at their Norwich station a fine fleet of steam and petrol motor wagons, for bringing coal into the works and taking out coke and fittings. Where one has not a railway siding, these are a necessity; but in any case, Mr. Glover finds, they have advantages over a railway, in that they are more flexible.

Mr. F. Prentice (Ipswich), in proposing a vote of thanks to Mr. Glover for his lecture, to which they had all listened with a great deal of pleasure, said that that gentleman was to be congratulated in no small degree upon the way in which he had overcome the various difficulties that presented themselves—more especially in the matter of the foundations. The whole work from start to finish reflected very great credit upon Mr. Glover; and their sincere hope would be that he might live long enough for Norwich to require a further reconstruction scheme, and might carry it out.

The Hon. Secretary (Mr. W. H. Mainwaring) said he desired the privilege of seconding this vote of thanks, in order that he might have an opportunity of expressing his personal obligation to Mr. Glover, in addition to the obligation the Association were under to him, for providing the excellent fare for that day's meeting. Mr. Glover had come to his assistance when he was in serious difficulty, and he felt that he would never be able to repay him for the help he had given.

The President said Mr. Glover had been good enough to throw his lecture open to discussion; and if there were any points that occurred to them, no doubt he would give them what further information he could.

Mr. W. W. Townsend (Colchester) said he would like to express his appreciation of the splendid programme that had been placed before the Association that day. There was, of course, a great deal that they could discuss in the lecture, and in what they had seen. One thing that must have struck everyone was the great architectural skill that had been displayed in the construction of the new buildings. It was very seldom they saw a retort-house carried out in so fine a manner. The difficulty met with in the foundation work appealed to him, because he himself had had a very similar problem to deal with. He (the speaker) considered the "Simplex" pile, and decided that on the face of it—experience no doubt had shown different—it would not for his particular purpose be so reliable as a pre-cast pile. He noticed that Mr. Glover had a row of five piles under a stanchion, and the driving of these close together must very much disturb the ground in the vicinity. Unless one allowed a very large margin of safety, it seemed to him that there would be just a risk of not getting the factor of safety desired. He had pre-cast piles made, and one pile was designed to carry 75 tons, and had done it successfully without the slightest movement. It was true there was a good deal of delay, but he was quite satisfied that in his own case it was the right thing to do, because they did not know beforehand the length the piles would have to be. This was a rather interesting point for anyone contemplating foundation



CHARGING STAGE OF GLOVER-WEST VERTICAL RETORT BENCH.

work of the kind. Another very interesting matter that Mr. Glover had not enlarged upon was the method of dividing up the works into manufacture on one side and purification and storage on the other. He had shown great ingenuity in making the best use of the existing sites. By the arrangement adopted, though the land was well covered, there was plenty of room to carry out the necessary operations. It was rather unusual to work scrubbing plant, for instance, under a vacuum—except in the case of the water gas, which had to be sent from the generators half-a-mile to the relief holder at the other station. Did Mr. Glover rely upon the pressure in the generator to accomplish this work, or had he to put down an exhauster to draw the gas from the plant? What arrangements had he for getting coal by rail? Had he any means at the sidings for tipping wagons? Otherwise there was a great deal of work required to shovel coal from the trucks into the motor wagons.

Mr. Glover said, with reference to the piles, that he claimed they improved the ground by driving the steel tube, and they were able to follow the placing of one pile immediately by the driving of the steel tube again. The concrete was not destroyed or upset by putting in the second pile; it compressed the earth. With regard to not knowing the depth of pile required, they got over this by driving beforehand; and they could go on putting in any number of piles without doing damage to those already moulded in the steel tube. With regard to coal, it was a fact that he had found it very expensive shovelling the coal out of trucks. Therefore they arranged with the Railway Company, on good terms, for the establishment of a depôt at the City Station. Here they had a crusher, and elevated the coal into a big bunker overhead, so that the steam wagons could draw under and be loaded. In this way they could load 6 tons in about three minutes, and this saved a tremendous lot. At the works end it just went into an underground hopper. This was the way to minimize the drawback of not having a railway into the works; and it did not cost much more. As to whether they received any coal by water, they did not get it by sea and river now; but they did, from one of the termini of the railway, discharge into barges and bring it into the works; so that it was brought by rail and river, and not by sea and river. Of course, the arrangement of the two works was not what one would choose to do. It was making the best of the two sites. The water gas was delivered under the pressure of the generator to the relief holder at Bishop Bridge without drawbacks, except that the condensates were rather considerable between the two works. This difficulty was got over by a compressed-air displacement system into a main which delivered to the manufacturing station, where the condensates could be satisfactorily dealt with. In connection with the coal gas, the same method had been adopted.

Education and Examination Scheme.

The President said they had with them, as representing the Institution of Gas Engineers, Mr. Walter Hole, a gentleman who was well known to all of them. He had come to explain the scheme suggested for the future education and examination of those engaged in the technical work of the gas industry.

Mr. Hole then proceeded to describe the scheme which is being considered by representatives of the Institution of Gas Engineers and of the Board of Education. In the course of his explanatory statement, he thoroughly expounded the scheme; and questions having been asked and answered, the members unanimously passed the following resolution:

> "That this meeting of the Eastern Counties Gas Managers' Association, having been supplied with copies of the scheme for the future education and examination of those engaged in the technical work of the gas industry, without committing themselves to detail, accept the principle of co-operation between the Institution of Gas Engineers and the Board of Education as therein outlined."

A hearty vote of thanks was accorded Mr. Hole for the trouble he had taken in the matter, on the proposition of the President, seconded by Mr. E. F. Keable (Southtown).

Place of Next Meeting.

The President said it was usual for the spring meeting of the Association to be held in the President's town, and his Chairman and Directors had asked him to give the members a very cordial invitation to visit Southend next April. They would be very pleased to see them, and would do their utmost to make the occasion enjoyable.

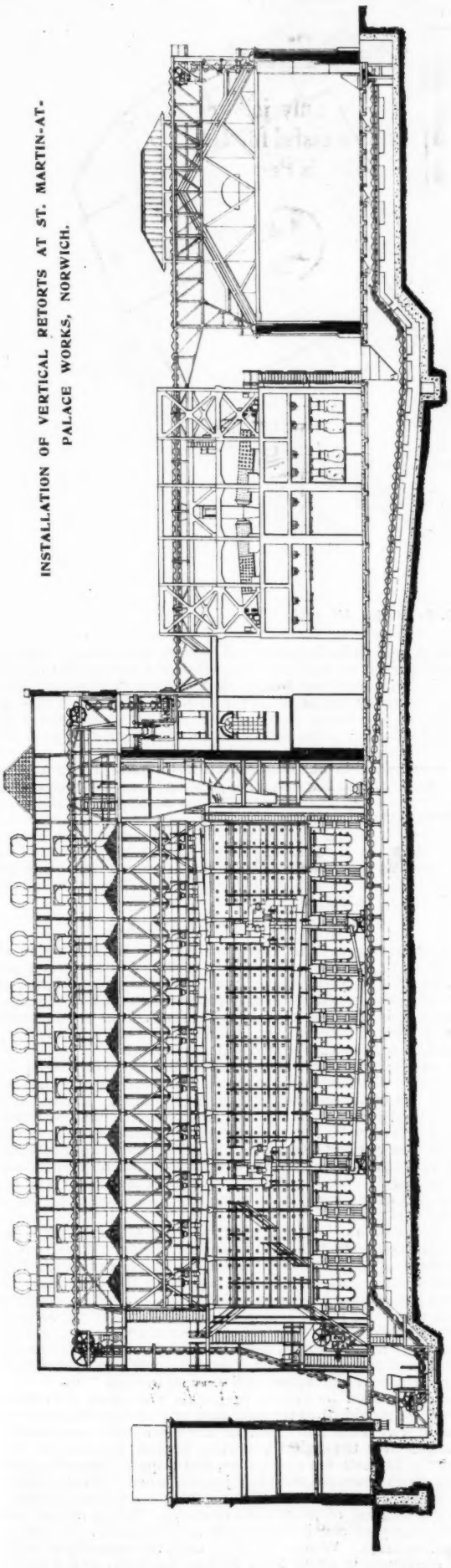
The invitation was cordially accepted.

Tea in the hotel brought to a close an unusually well attended and an unusually successful meeting.

GAS-WORKS RECONSTRUCTION AT NORWICH.

Synopsis of the Lecture by Mr Thomas Glover, C.B.E., M.Inst.C.E.

I have the honour to submit for your consideration the following experiences and reflections on gas-works reconstruction carried out under my supervision at Norwich. The lantern slides will enable you to see some of the difficulties which we had to



INSTALLATION OF VERTICAL RETORTS AT ST. MARTIN-AT-PALACE WORKS, NORWICH.

overcome, and the sequence of events which have resulted in the provision of up-to-date manufacturing plant, to ensure a reliable supply of gas to the city and district.

The necessity for remodelling and reconstruction, which occurs at intervals of varying lengths of time, is due to the effect of wear and tear on structures, plant, and apparatus, and the need for modernizing out-of-date plant, to secure the advantages of scientific and practical advancement in the methods of manufacture, distribution, and application of gas. A further substantial advantage is secured by the reconstruction of an ancient manufacturing station, as, though little additional land may be acquired, the reconstruction invariably results in obtaining a greater manufacturing capacity, and so takes the place of an extension or provision of new works, which it is obvious must in time be provided if the demand for the products manufactured continues to grow.

The Scheme of 1903-4.

By the scheme of reconstruction carried out at Norwich in 1903-4, the manufacturing capacity (practically on the same area of land) was more than doubled, and the cost of manufacture greatly reduced. A site congested with old buildings and obsolete plant was relieved by the conversion of a derelict works into an efficient purifying and distribution station, which arrangement constituted a distinct departure from ordinary practice. The key to a puzzling situation was found in this removal of purifiers from a congested manufacturing site. It saved the necessity at the time for the acquisition of a new site and the provision of an entirely new works—an alternative then next to impossible.

The reconstruction schemes of 1903-4 provided the Company with well-balanced, economical, and efficient manufacturing equipment, which served the city with gas and other products until a few days ago, when the new section came into operation, though the demand for gas has continued to grow throughout the intervening period, and is now more than double that in the years named.

Second Period of Reconstruction.

The second period of reconstruction, more this time in the nature of an extension (although only a very small additional area of land has been purchased and utilized), dates from the end of the war; and the scheme provides, when completed, for again doubling the manufacturing capacity.

In each case the remodelling scheme has involved the removal of a worn-out gasholder and steel tank, which formed part of a complete works at St. Martin-at-Palace, constructed in the year 1851. The condition of the material taken from these sixty-year-old gasholders is worth observation. The sheeting, tank plates, and guide-framing girders were badly corroded, the tanks and holders were leaky and unsafe, but the internal trussing (tees, angles, rods, &c.) was practically as good as new. The material was of fine quality, and part of the trussing of the second holder was utilized for the construction of an emergency elevator and conveyor during the war, when such material was difficult to obtain. The elevator and conveyor were provided to meet a new need brought about by war conditions; but they have become permanent, and have already dealt with about 120,000 tons of coal.

Charging and Discharging Machinery.

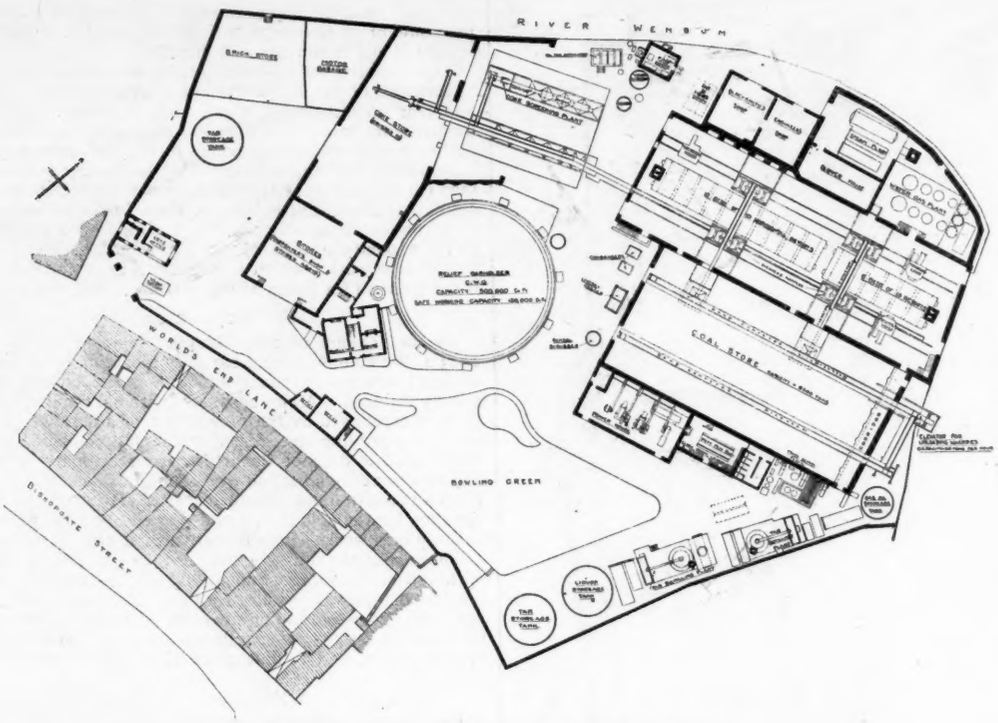
It is interesting to compare the types of manufacturing plant and machinery available for use by gas engineers in two periods of reconstruction and extension, with an interval of nearly twenty years. In 1903-4, the De Brouwer charger was only just emerging from Bruges, the city of its origin. The pushers for gas-works retorts came several years later. There was, at the time, considerable activity in devising new forms of mechanical appliances for use in the retort-house. I visited Zurich, and also saw, I think, the first De Brouwer charger under trial outside Bruges.

At one of the Paris Gas-Works I inspected a projector charger of a type which has been adopted with improvements; and recent installations have been made by one of the gas engineering firms in this country, although one would expect the wear and tear on the fan projector to be heavy compared with the simpler De Brouwer type. The conveyor types of retort charging machinery, which have been so successful in some large works, were introduced some years later.

The new retort-house of 1903-4 (built practically over an old ground-floor hand-stoked house) was equipped with sixteen settings of ten retorts, and worked with compressed-air machinery, the scoops of which put in charges of about 7 cwt. The coke from these light charges was drawn on to two conveyors, and by the time it reached the customers' premises it was small and often over-quenched. This type of machinery was succeeded in a few years by the combined De Brouwer projector and pusher, which enabled me to carry out some interesting and successful experiments with retorts or chambers of rectangular section, each holding a 21 cwt. charge.

Heavy Charges and Longer Periods.

A retort-house of limited capacity with mixed sections of retorts is not desirable; and so, having learned the advantage of heavy charges and longer periods, we eventually settled down to 14 cwt. charges in 22 in. by 16 in ⌂ section retorts, and twelve-hour periods. Heavy charges with pusher dischargers, in addition to making good coke (which has always commanded a ready sale and a good price), have also solved many other difficulties—viz., larger production of condensable liquid hydrocarbons, with reduced formation of naphthalene, sulphur compounds, and hydrocyanic acid. This mode of carbonizing, with good retort



THE ST. MARTIN-AT-PALACE GAS-WORKS IN 1918.

temperatures, will ensure 70 therms per ton from clean Yorkshire coal, and the gas so made will carry sufficient natural lubricant to prevent undue corrosion of mains, services, and meters.

Retort-House Governors.

In a paper read before a meeting of this Association held at Peterborough in 1904, I described the governing arrangements adopted in this same retort-house. These retort-house governors (which were the first to be used outside certain London works) were intended to control the vacuum from the exhausters in conjunction with dry mains in place of hydraulic mains and dip-pipes on the retort-benches. The governors proved invaluable for controlling the vacuum where the exhausters are some distance from the retort-house, but the arrangement was not sufficiently responsive, on the retort-benches, to the varying flow of gas, and we reverted to hydraulic mains, dip-pipes, and light seals.

Light and uniform seals in hydraulic mains are very desirable, and are attainable with a fair degree of accuracy when retort-benches are new; but, due to heating-up and letting-down of settings, with expansion and contraction of brick and steel work, it is impossible for any length of time to depend on uniform seals—which really means that some settings are too lightly sealed unless others have undesirably deep seals.

This became the case with the retort-house under consideration, and the problem of getting the gas readily away from the retorts without damaging its quality occasioned a great deal of anxious concern and thought. Individual anti-dips proved slow and difficult to instal in a large retort-house with a considerable proportion of settings always at work. I was therefore relieved when I found, through walking round the Old Kent Road works with Mr. G. M. Gill (then Chief Engineer to the South Metropolitan Gas Company) that that Company had actually succeeded, with sensitive retort-house governors, in working with safety, and with a low percentage of inerts, without using sealed dip-pipes. I at once resolved to improve our governing arrangements; and by an installation of sensitive governors over the two retort-benches, and with careful adjustment, we have for three years been able to realize the benefits of reduced pressure in the retorts and less loss through leaky retort mouthpieces and doors. At the same time we have succeeded in keeping the inerts down to about 12 p.ct.

70 Therms per Ton.

It will be agreed that 70 therms per ton of coal represents good carbonizing practice; and it may be accepted that this quantity of potential heat is practically all that can be obtained in the form of uncondensable, gaseous hydrocarbons, the products of distillation in horizontal retorts. Any additional therms from a ton of coal must be obtained either by the prevention of destructive cracking of gaseous hydrocarbons, which appears to be possible in continuous vertical retorts (with steaming, and with the formation of limited quantities of water gas), or by the extraneous gasification of coke with the splitting-up of water into its elements, as is done in the water-gas and in the producer-gas systems.

The relative merits of arrangements and combinations of plants for the realization of a greater percentage of gaseous potential heat units from the coal treated, is too large a subject to be discussed on this occasion. Suffice it to say that the gas supply of Norwich was fully maintained during the periods of coal shortage by the generous use of water gas; and it may be regarded as a fortunate circumstance that the two units of plant installed about 25 years ago under the direction of the late Sir Corbet Woodall had been, previous to 1914, brought up to date, and were available at the most critical times. By graduated carburation of the blue water gas when a certain percentage added to coal gas was exceeded, it was possible to maintain a steady calorific standard.

The interests and convenience of our consumers were always kept in view; and I am quite sure the Company's good relationships with their consumers were maintained and strengthened by the care taken in the methods of manufacture adopted during the periods of coal shortage.

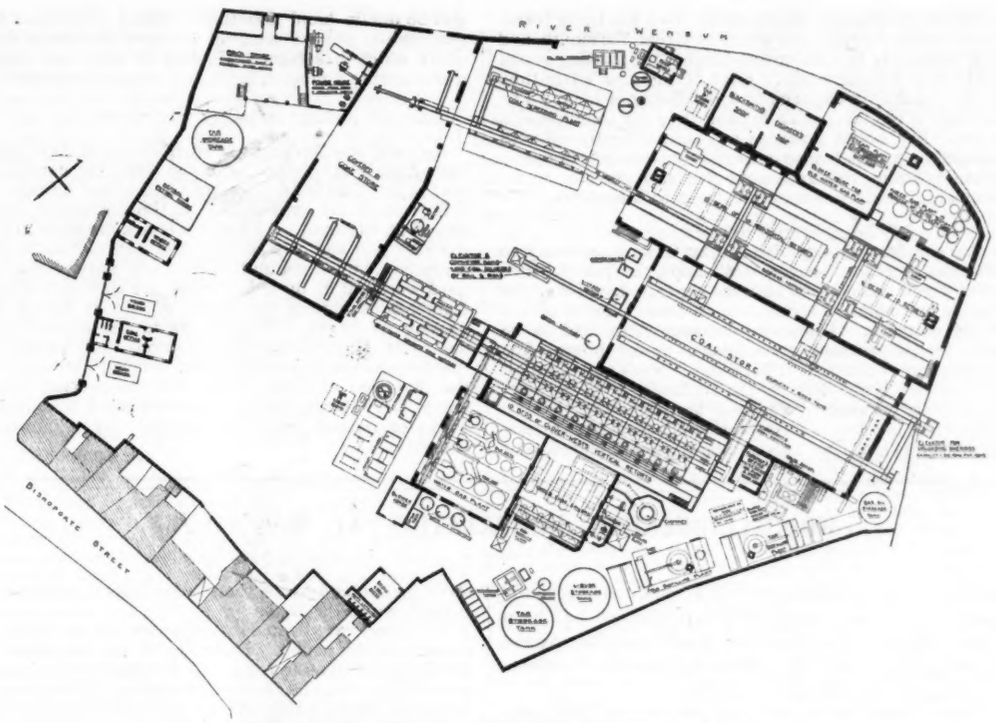
Glover-West Vertical Retorts.

Forgive this digression. I was dealing with reconstruction of manufacturing plant, and chiefly with carbonizing and water-gas plant. The 1903-4 scheme of reconstruction provided for an output of 3 million c.ft. per diem. The extension and remodelling of 1919-22 provides for 2½ to 3 million c.ft. from continuously operated vertical retorts, with steaming, and an additional 1½ million c.ft. per day carbureted water-gas plant.

The new vertical retort-house area for this make is 7520 sq. ft., as compared with the horizontal house with five-tiers of retorts for 2 million c.ft. capacity, which occupies 15,060 sq. ft. This reduced area required for a given production was one of the important controlling factors leading to the decision to adopt for our extension this type of plant. Other features which affected our decision were: (1) Reduced smoke and steam by abolition of intermittent charging and discharging; (2) reduced operating costs; and (3) the prospect of getting greater value in gas and other products from the coal used.

The installation of vertical retorts is of the Glover-West type, and consists of ten beds of eight retorts in a setting. The furnaces are of the stepped grate design, and are of ample capacity. The provisions for regulation of temperatures to the later ideas of steaming the charges have been well carried out, and the controls both for regulating throughput of coal per retort and per setting, and for matching the temperature of the retorts to the throughput, are features which commend themselves to those who wish to see the process of carbonizing carried out with precision, and with a view to realizing a high value from the coal treated.

Coke is removed by gravity lip-bucket conveyors (two lines of which are provided) to the coke store or to the grading screens and hoppers. This new form of conveyor has considerable advantages over the ordinary gravity bucket, as owing to the overlap the buckets are continuous, and require no mechanical filler, to which there are serious objections when it is coke which has to be filled into buckets without spilling and without holding-up by the choking of contracted openings. Either of the two lines of conveyors can be alternately used for coke or for filling the coal bunkers. When conveying coal, the capacity of each line of conveyors is about 60 to 70 tons per hour, with a speed of 40 ft. per minute.



THE ST. MARTIN-AT-PALACE GAS-WORKS IN 1922.

Coal to the retort-house bunkers can be taken from the coal store by a band conveyor feeding the gravity buckets, or the gravity buckets can be fed direct by the steam wagons delivering coal from the railway depot. A cross conveyor will deliver coke direct from the retort-house to the bunkers of the adjoining water-gas house. At the time of writing, six of the ten settings have been brought into use, and are working in a very satisfactory manner.

Figures as to the therms produced per ton of coal and of gas made per retort are not at the time of writing ready for reporting, but the prospects of high results are quite promising.

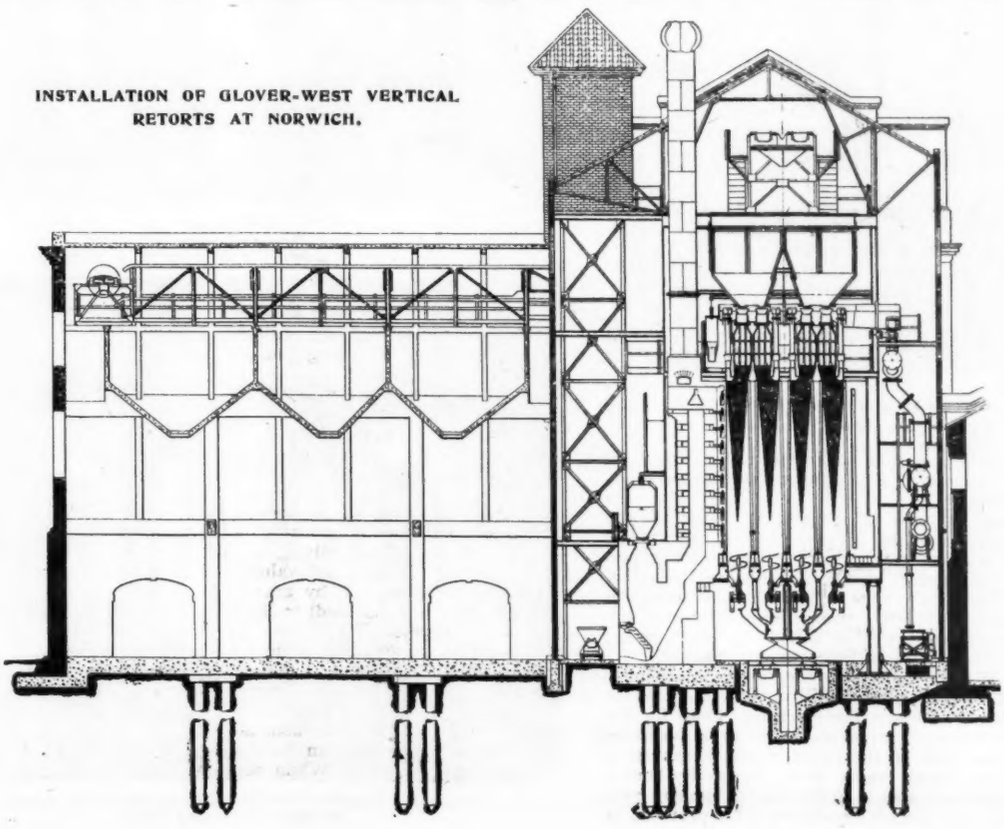
Other Plant.

The gas from the vertical retorts is passed through water-cooled condensers and a centrifugal washer (the lower tiers of which are supplied with coal-tar distillates as an absorbent medium for the removal of tar fog and naphthalene), and finally the gas is freed from ammonia by the use of a standard type of washer-scrubber, the supply of fresh water being measured by a low-pressure water-meter. The gas then passes to the Bishop Bridge works for purification, measurement, storing and distribution. A scheme for extension at these works is now being prepared.

Adjoining the vertical retort-house are the buildings for housing steam boilers and three sets of water-gas plant—two sections of plant being transferred from a somewhat restricted building where repairs are difficult to carry out, and, in addition, one new set of 1½ million c.ft. per day capacity has been provided. The latter plant is complete with the latest methods of controlling air and steam supplies, and for interlocking to avoid unpleasant results due to oversight in methods of operation.

Four new boilers of the water-tube type, with chain grate stokers, superheaters, and economizers, take the place of three

INSTALLATION OF GLOVER-WEST VERTICAL RETORTS AT NORWICH.



Lancashire boilers now being dismantled. Two are being transferred to the Company's chemical works at Great Yarmouth, and the third will ultimately be used to supplement the existing steam plant at the Bishop Bridge works. Each of the new water-tube boilers has an evaporative capacity of 670 gallons per hour. The working pressure is 160 lbs. per sq. in., and they are supplied with softened water. The boiler furnaces are automatically fed with fuel on to travelling grates from overhead ferro-concrete hoppers, and the ashes are removed by a conveyor and elevator to an overhead hopper, also of ferro-concrete, lined with firebrick.

SHOPS, MESS-ROOMS, &c.

To clear the site for the extended works, it was necessary to remove the works' stores and carpenters' shops, the power house where electricity and compressed air were generated, and also the workmen's mess and ablution rooms, the foreman's house, and a number of old cottages. Temporary arrangements had to be hastily made for improvised mess-rooms, power house, &c., pending the erection of permanent buildings. Mess and ablution rooms with good accommodation for the cooking of food, bathing, changing, and drying of clothes, &c., have been provided.

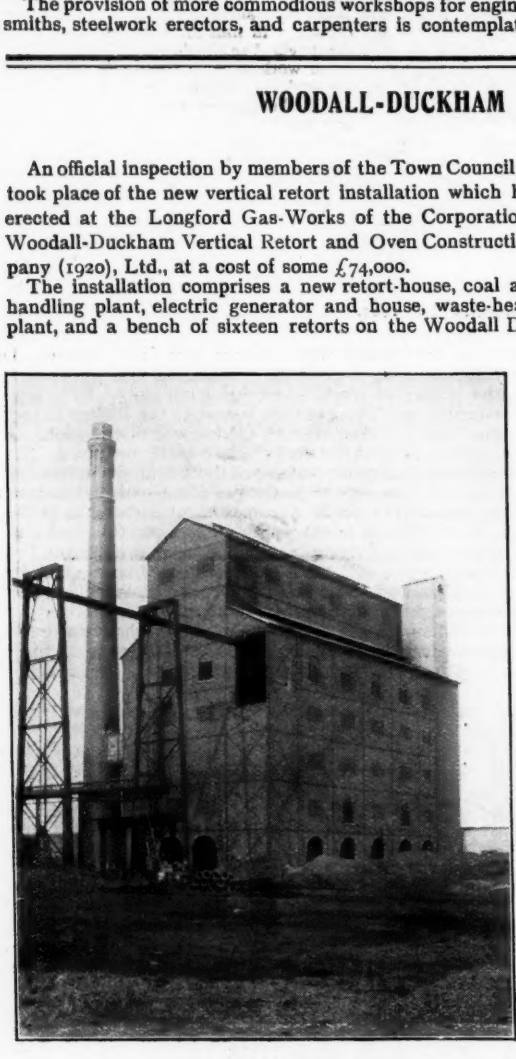
The provision of more commodious workshops for engine fitters, smiths, steelwork erectors, and carpenters is contemplated, and will be put in hand now that building costs have become more reasonable, and as soon as we have recovered from the great effort which has been necessary to carry out these large new works during a most difficult and expensive period.

Any engineer undertaking such reconstruction work such as I have described needs to have the complete confidence and support of his Chairman, Directors, and fellow officers; and I gratefully record my appreciation of the sustaining help I have received at all times. I have also to acknowledge in grateful terms the attention and care of the chief contractors and their representatives, and my admiration of the unremitting attention and hard work put in by members of my staff, including Mr. Donald Cameron (Architect and Surveyor), Mr. H. Edgar Bryant (Engineering Assistant), my assistants in the manufacturing department (Mr. Harston and Mr. Weston), and the superintendent of the distribution department (Mr. Wayte), who was responsible for the diversion of works mains and the revised lighting arrangements. My thanks are also due to a band of skilled and patient workmen, whose work has excited my admiration on many occasions.

WOODALL-DUCKHAM INSTALLATION AT WARRINGTON.

An official inspection by members of the Town Council recently took place of the new vertical retort installation which has been erected at the Longford Gas-Works of the Corporation by the Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd., at a cost of some £74,000.

The installation comprises a new retort-house, coal and coke handling plant, electric generator and house, waste-heat boiler plant, and a bench of sixteen retorts on the Woodall Duckham continuous vertical system, each retort being capable of carbonizing 7 tons of coal per day, making a total capacity of 112 tons.



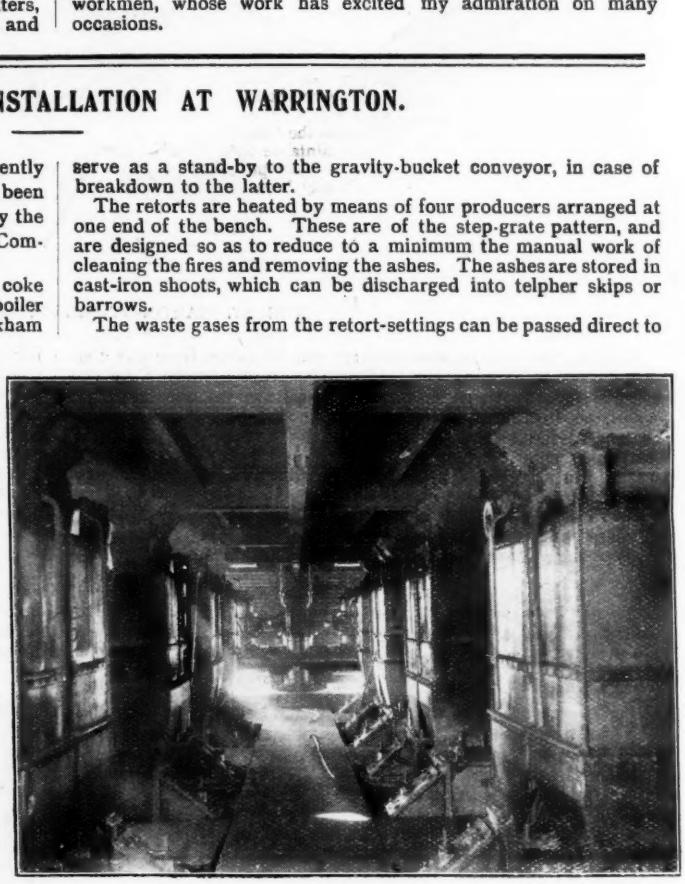
General View of Retort-House.

Coal arrives on an elevated railway siding; and the wagons are discharged by hydraulic tipping rams. The large coal is delivered by means of a jigging screen into a four-roll coal breaker, and thence to a gravity-bucket conveyor. The small coal goes direct through the screen to the conveyor, by means of which it is elevated to the storage bunkers over the retort-bench. From these the coal is fed to the retorts in the customary manner.

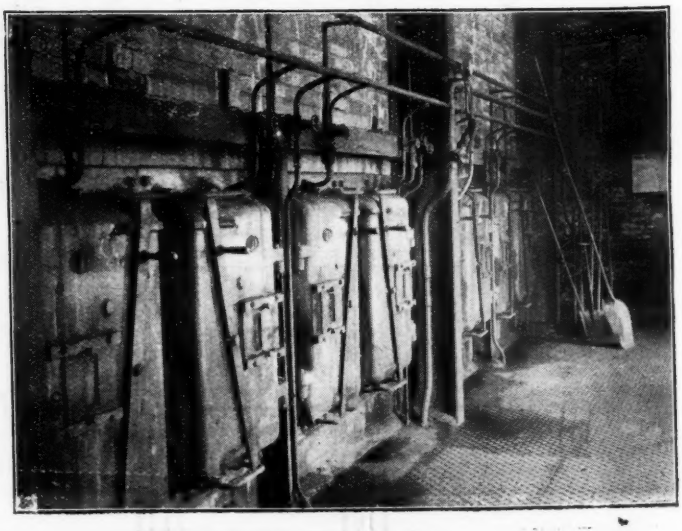
The coke is discharged from the retorts into telpher skips; and the telpher discharges these into the yard for storage purposes, or into railway trucks. Coke for the producers is conveyed in special skips to a receiving hopper at one end of the retort-house, whence it is delivered by a jigging feeder into the gravity-bucket conveyor, which elevates it to the storage bunkers over the producers. An electrically driven lift is provided to serve as a stand-by to the gravity-bucket conveyor, in case of breakdown to the latter.

The retorts are heated by means of four producers arranged at one end of the bench. These are of the step-grate pattern, and are designed so as to reduce to a minimum the manual work of cleaning the fires and removing the ashes. The ashes are stored in cast-iron shoots, which can be discharged into telpher skips or barrows.

The waste gases from the retort-settings can be passed direct to



Charging Platform.



Producer Clinkering Stage.

the chimney, when working under natural draught. They may alternatively be drawn through a waste-heat boiler plant by means of an electrically driven induced-draught fan, which returns the spent gases to the chimney stack.

The coal breaker and coke extractors are operated by means of steam-engines. The gravity-bucket conveyor, telpher, lift, and induced-draught fan are electrically driven. Current is supplied by a 35 KW. steam-driven generating set. Practically the whole of the steam required to operate the plant is furnished by the waste-heat boiler. Two retort-house governors are provided to regulate the pull of the exhausters on the retorts.

Those present at the inspection included Mr. J. T. Locker (Chairman of the Gas Committee), Alderman John Evans (Deputy-Chairman), Mr. W. S. Haddock (Engineer and General Manager of the Gas Department), Mr. A. Cook (Assistant Engineer), and Mr. William Newbigging (Consulting Engineer); while the contractors were represented by Sir Arthur Duckham and Messrs. F. B. Richards, W. T. Gardner, A. N. Tarrant, and M. Wadsworth.

After seeing the new plant, which was working efficiently, the visitors partook of refreshments.

Alderman BENNETT, giving the toast of Councillor Locker and his Committee, the officials and contractors, with cordial congratulations on the success of their undertaking, said that though he had been a member of the Council for more than thirty years, he was ashamed to say that this was the first time he had been to the Longford Gas-Works. He could not, however, have made acquaintance with the works in more congenial and pleasant circumstances than prevailed that afternoon. The Gas Committee and officials had been criticized a good deal—perhaps unfairly and without sufficient knowledge on the part of the critics—but he was sure that the members would be glad, and the Council proud, at what they had just seen. The new plant embodied all modern improvements and labour-saving devices; and when the whole town realized it, they would be grateful to a Council who got "more kicks than halfpence." He appreciated profoundly the expert knowledge put into that great work, and thought the tour of inspection had been most enlightening and instructive.

Councillor SEED, supporting, said it was nice to feel that working conditions were among the things improved. He understood that it would be possible to extend the new plant just as they required, to provide for the wants of the town.

Councillor BOLTON remarked that 15 men on the new plant would do the work of 39 on the old, and produce better gas. If Warrington was not going to be satisfied with a plant like that, he did not know what they wanted.

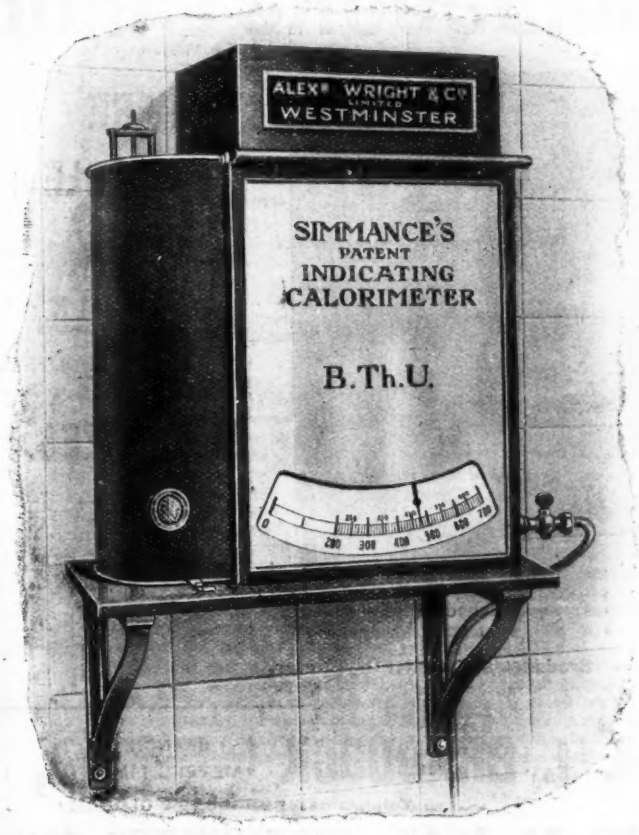
Councillor LOCKER, in reply, said he had looked forward for ten years to the possibilities of Warrington having a plant such as that. As far back as 1912, it was seriously considered whether they should adopt a vertical plant; but they did not then altogether agree as to which was the best system, and were still discussing the matter when the war overtook them and compelled them to postpone the scheme. Had the new plant been installed before the war, they would have derived considerable advantage; but, on the other hand, they would not have had such a plant as had now been installed. They welcomed Sir Arthur Duckham—one of the leading lights in this type of work—who had done much to bring about a better condition of work for those engaged in gas production, as well as better results. They sincerely hoped the result of the installation of the plant would be a reduction in the price of gas. He thought that Alderman John Evans, who had served them for thirty years, must at that moment be as proud as any man. In conclusion, he thanked the contractors for their hospitality.

Sir ARTHUR DUCKHAM said he fully realized the great responsibility on the Gas Committee of making a decision with regard to the installation, even on the recommendation of so eminent an engineer as Mr. Newbigging; and the Council would have had something to say if it had not been a success. He thought they were all satisfied. Perhaps the keenest critic present was himself. He knew the thousand-and-one things required in a proper working plant; and he could assure them that he had no criticism to take with him to his office and to pass on to his people. He thought they had an absolutely satisfactory plant, which would give them, even working well within its limits, what it set out to do; and the men working the plant, he found, were satisfied. In the life of the citizens, a cheap, good supply of gas became daily more important. They had here the nucleus of a great development in their gas undertaking. The success of the installation was largely due to the courtesy and kindness of Mr. Haddock, Mr. Cook, and everybody else concerned.

Mr. NEWBIGGING said he had always rested in the calm assurance that when the work was finished, and the Council saw the results, they would be satisfied and proud. He had just put down a similar plant at Manchester. He hoped the new installation would have a long life, and that the Council would reap the reward of their enterprise.

Ventilation and Atmosphere.—A lecture (illustrated by lantern slides) on "Ventilation and Atmosphere in Factories and Workshops," with demonstrations of the Kata-thermometer, will be given by Prof. Leonard Hill, M.D., F.R.S., in the Gallery of the Royal Institute of British Architects, No. 9, Conduit Street, W. 1, on Thursday of this week at 8 p.m. The chair will be taken by Sir William J. Collins, K.C.V.O., M.D., M.S., B.Sc., F.R.C.S., Chairman of the Chadwick Trustees.

CALORIFIC POWER AT A GLANCE.



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MISCELLANEOUS NEWS.

GAS REGULATION ACT APPLICATIONS.

The following further notices have appeared in the "London Gazette" regarding applications to the Board of Trade for Orders under the Gas Regulation Act.

Radcliffe and Little Lever Joint Gas Board.

The maximum price now authorized in respect of the supply of gas by the undertakers is 7s. 6d. per 1000 c.ft.; and the price they have asked the Board of Trade to substitute for this is 1s. 6d. per therm.

It is also proposed that an additional charge of 3½d. per therm should be authorized in respect of gas supplied through a prepayment meter.

Sandwich Corporation.

The Sandwich Corporation give notice that the additional price which they have asked the Board of Trade to substitute for the price of 1s. per 1000 c.ft. outside the borough is 2·40d. per therm, and not 1·20d. per therm as stated in the notice previously published.

DECLARATIONS OF CALORIFIC POWER.

Bexhill Water and Gas Company.—480 B.Th.U. (Dec. 25.)
East Dereham Urban District Council.—450 B.Th.U. (Nov. 1.)
Eye Corporation.—500 B.Th.U. (Jan. 1, 1923.)
Hexham Gas Company.—425 B.Th.U. (Jan. 21, 1923.)
Killamarsh Gas Light and Coke Company, Ltd.—480 B.Th.U. (Jan. 1, 1923)
Llynvi Valley Gas Company.—425 B.Th.U. (Jan. 1, 1923.)
Tadcaster and Wetherby District Gas Light Company, Ltd.—525 B.Th.U. (Jan. 1, 1923.)
Westhoughton Consumers' Gas Company.—500 B.Th.U. (Dec. 22.)

GAS REGULATION ACT ORDER.

The Director of Gas Administration has forwarded copies of the following further Orders made by the Board of Trade under section 1 of the Gas Regulation Act.

Havant Gas Company.

After the declared date, the standard price in respect of gas supplied by the undertakers shall be 14·6d. per therm.

For the purpose of ascertaining the authorized rate of dividend, any price charged per 1000 c.ft. before the declared date shall be rendered into the equivalent price per therm by dividing it by four-and-one-half.

Prepayment meter clauses are included. (Oct. 17.)

Ogley Hay and Brownhills Gas Company, Ltd.

After the declared date, the maximum price in respect of gas supplied by the undertakers shall be 16·4d. per therm, and this price shall be substituted for the price of 4s. 6d. per 1000 c.ft. wherever it is mentioned in section 31 (price of gas) of the Brownhills and District Gas Order, 1910.

After the declared date, "therm" shall be substituted for "1000 c.ft.," and the words "fifth of a penny" shall be substituted for the word "penny," wherever they occur in paragraph (2) of Schedule B to the Brownhills and District Gas Order, 1910. (Oct. 16.)

LONDON COUNTY COUNCIL AND THE THERM BASIS.

Suggestion to Ask for an Inquiry Agreed to.

At the meeting of the London County Council on Tuesday of last week, the Public Control Committee reported that they had had under consideration a large number of complaints from gas consumers alleging that, in consequence of the new method of charging for gas by the therm, their accounts for the quarter ended June 30 were much in excess of the corresponding quarter of the previous year. They thought it was very desirable that the Council should make representations to the Board of Trade with a view to their holding an immediate inquiry into the question, and recommended: "That, in view of the prevailing discontent, the Board of Trade be asked to institute an immediate inquiry into the question of the method of charging for gas by therm."

The report was received and the recommendation agreed to.

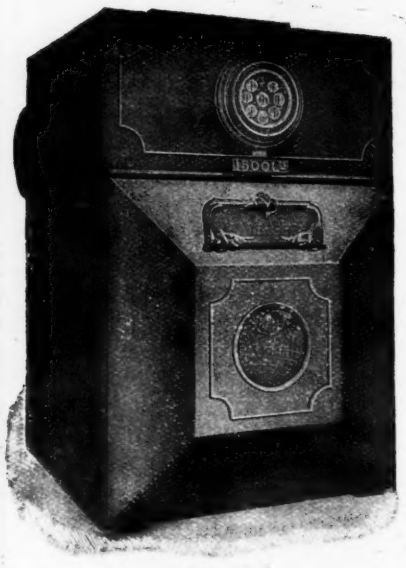
Mr. DAVID DAVIS (North Kensington), moved: "That, having regard (i) to the fact that the 'standard' price of gas per therm varies in different areas in London, and (ii) that apparently the costs and charges of, and incidental to, the production of gas have substantially altered, as is shown by the increased dividends paid by certain undertakings, it be referred to the Public Control Committee to consider and report whether the time has now arrived for the Council, as the local authority under the Gas Regulation Act, 1920, to apply to the Board of Trade under section 1, subsection 3, of the said Act, in the interests of consumers, to make amending Orders, revising the present authorized standard prices." He said he did not propose to make a speech, as the Chairman of the Public Control Committee was both willing and desirous to accept the motion so far as his Committee were concerned.

Mr. HENRY MILLS, J.P. (West Kensington), seconded the motion.

Mr. ERNEST SANGER, J.P. (St. Marylebone), Chairman of the Public Control Committee, said he was both willing and desirous that this matter should come before his Committee, and, on their behalf, he accepted the motion.

The motion was then carried unanimously.

BRADDOCK'S LARGE GAS METERS



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ALL SIZES.

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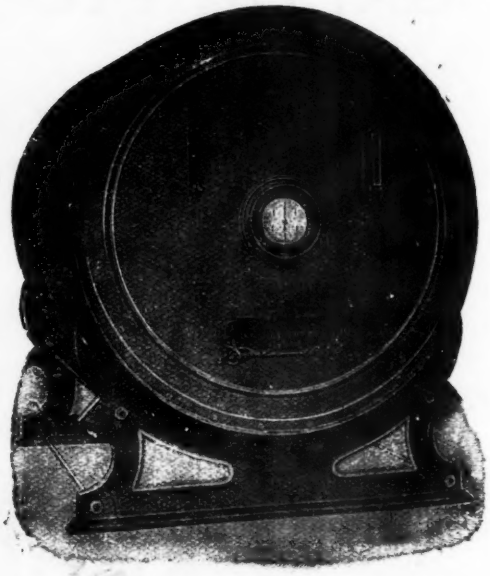


No. 219. Braddock's 1500 lts. Dry Meter.

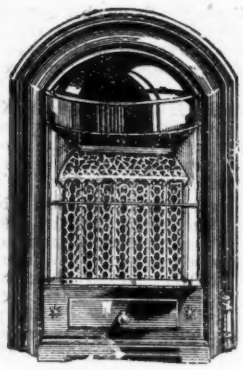
No. 245. Braddock's 1500 lts. Wet Meter

J. & J. BRADDOCK (BRANCH OF METERS LIMITED), **Globe Meter Works, OLDHAM.**

Telegrams: "BRADDOCK OLDHAM." Telephone No. 815.

AND 45 & 47, WESTMINSTER BRIDGE ROAD, LONDON, S.E. 1.

Telegrams: "METRIQUE, LAMB, LONDON." Telephone No. 2412 HOP



No. 590 Fire.

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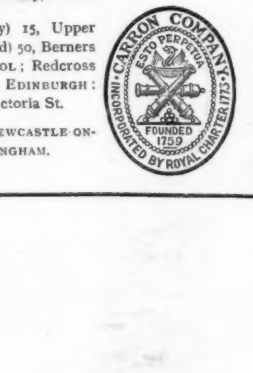


No. 591 Fire.

CULROSS AND THE EARLY HISTORY OF GAS.

The Dunfermline Corporation Gas Department, on the advice of the Manager (Mr. James Campbell), recently extended their high-pressure mains to the ancient Royal Burgh of Culross, and on Saturday, Oct. 7, the public lighting was formally inaugurated. The Senior Bailie, on behalf of the Culross Town Council, conveyed their appreciation of the way the whole scheme had been carried out, and their satisfaction with the public lighting.

Particular interest attaches to this development, in that it is claimed that Culross was the place where gas was first made. According to the "Dictionary of National Biography," Vol. XI., Archibald, the ninth Earl of Dundonald, in prosecution of his coal-tar patent, "went to reside at the family estate of Culross Abbey in 1782. Here he erected kilns, and superintended the working of his collieries on the adjoining properties of Valleyfield and Kincardine; but his unbusinesslike management led only to ruin. An explosion of one of the kilns, and the combustion of the escaping gas, suggested to Dundonald the possibility of applying coal gas as an illuminating agent."

In "Culross and Tulliallan," by D. Beveridge, the author states that "the Earl of Dundonald was of great scientific abilities, and of an active and acute, but speculative, disposition, but ruined himself by the multifarious and profitless schemes in which he engaged. One special subject that occupied his energies—the manufacture of coal tar—has immortalized him, and ought fairly to be attributed to him as his own peculiar invention. For this he took out a patent, which might have been the means of making his fortune had it been properly managed; but his want of business capacity made all his scientific genius practically useless. A works for extracting the tar was erected by him, and traces of the gateway and other buildings connected with it are still (1885) to been seen. His son, Lord Dundonald, the celebrated naval hero, better known as Lord Cochrane, claims in his autobiography the merit for his father of having first discovered the illuminating powers of coal gas. In the course of his experiments at his factory at Culross, he noticed the inflammable nature of the vapour raised during the distillation of the tar, and he accordingly fitted a gun-barrel to the pipe leading from the condenser. On applying a light to the extremity of this, a blaze of flame burst forth, and cast an illumination that was visible from the opposite shore at Barrowstourness. Some time afterwards, when Lord Dundonald and his son were travelling to London, they paid a visit to the celebrated James Watt, then engaged in conducting the works for construction of steam-engines at Soho, near Birmingham. One of his assistants was Mr. Murdoch, who afterwards attained a reputation, scarcely inferior to that of his master, as the first to make use of coal gas as an illuminating agent. During the visit, the incident at the tar-works at Culross was frequently discussed; and there can be little doubt that Mr. Murdoch derived on this occasion the information which he afterwards turned to practical account."

After the long interval of 140 years, gas is again introduced into Culross, not only for public and domestic lighting, but also for cooking, heating, and many other purposes for which gas is now used. The price of gas in Dunfermline is 3s. 2d. per 1000 c.ft., and Culross consumers will be charged 1s. per 1000 c.ft. extra, which is a very moderate price for such a small burgh, situated as it is some seven miles from its source of supply.

Southampton Gas Light Company.—The accounts of the Company for the half year ended June 30 show a balance of profit available of £21,542; and the Directors recommend the maximum dividend on the ordinary stock at 5 p.ct. per annum (less tax), and the dividend of 1 p.ct. (less tax) in respect of arrears of dividend (for the half year ended December, 1917).

Fatal Gas Escape.—A Halifax widow named Fortune died in the infirmary last Saturday evening as the result of gas poisoning. She had not been seen during the morning; and as repeated knockings at the door of the house had not been answered, an entrance was effected. Mrs. Fortune was found unconscious in bed. There was a strong smell of gas, though the tap of the bracket was turned off. An examination of the premises later revealed an escape of gas near the meter.

Irish Gas Prices.—On resolutions from the Pembroke and Blackrock Councils being submitted at the Rathmines Council, urging that the Free State Provisional Government should hold an inquiry into the method of charging for, and the quality and pressure of, gas supplied by the Alliance and Dublin Consumers' Gas Company, Mr. O'Reilly said the price of gas in the Dublin area was higher than in the British cities, and in comparison with Belfast it was 2s. per 1000 c.ft. more. It was decided to support the request for an inquiry. The Newry Gas Committee have reduced the price of gas from 7s. 1d. to 6s. 8d. per 1000 c.ft.; and Letterkenny's price (formerly 25s., the dearest rate in Ireland) has been lowered from 16s. 8d. to 12s. 6d.

Tamworth Gas Light and Coke Company.—At the meeting last week—Alderman G. Hoskison presiding—the Directors submitted the accounts for the year ended June 30, showing a profit of £1381. A dividend for the half year to Dec. 31 at the rate of 5 p.ct. per annum on the old shares and 3½ p.ct. per annum on the new shares (less income-tax) was paid; and the Directors now recommended similar dividends for the past six months. They much regretted that the profit was not greater, but this had been caused by the heavy slump in trade, and the large reduction in the value of residuals, while the after-effects of last year's strikes had been very costly. They reported with sorrow the loss the Company had sustained by the death of Dr. A. M. Sculthorpe, who was Chairman of the Company for many years. The Chairman said that as time went on they expected to get back to their full dividend, and also to reduce the price of gas. The report having been adopted, the Chairman and staff were thanked, and in reply the Secretary and Manager (Mr. W. A. Sapey) said the outlook for the coming year was brighter.

CURRENT SALES OF GAS PRODUCTS.

Tar Products in the Provinces.

Oct. 23.

The average values for gas-works products during last week were: Gas-works coal tar, 59s. to 64s. Pitch, East Coast, 100s. to 105s. f.o.b. West Coast—Manchester, 97s. 6d. to 100s.; Liverpool, 98s. 6d. to 100s.; Clyde, 100s. to 102s. 6d. Benzole 90 p.ct. North, 1s. 9d. to 1s. 10d.; crude 65 p.ct. at 120° C., 1s. 1½d. to 1s. 2½d. naked at makers' works; 50-90 p.ct., naked, North, 1s. 10d. to 1s. 11d. Toluole, naked, North, 2s. to 2s. 3d. nominal. Coal tar crude naphtha in bulk, North, 8½d. to 9¼d. Solvent naphtha, naked, North, 1s. 8d. to 1s. 10d. Heavy naphtha, North, 2s. to 2s. 1d. Creosote, in bulk, North, liquid, 6½d. to 6⅝d.; salty, 5½d. to 5⅝d. Scotland, 4⅝d. to 5d. Heavy oils, in bulk, North, 6½d. to 6¼d. Carbolic acid, 60 p.ct., 2s. to 2s. 1d. Naphthalene, £12 to £15; salts, £5 to £5 10s., bags included. Anthracene, "A" quality, 5d. per minimum 40 p.ct., purely nominal; "B" unsaleable.

Price Again Reduced at Walton-on-Thames.—The price of gas supplied by ordinary meter to private consumers by the Walton-on-Thames and Weybridge Gas Company is being further reduced from 1s. 5d. to 1s. 3d. per therm as from the reading of the indices for the Michaelmas quarter. This reduction is equal to 9d. per 1000 c.ft. Prepayment meter mechanism will be altered to deliver 156 c.ft. for 1s., or 13 c.ft. for 1d.

Gas or Electricity for School Lighting.—Mr. Herbert Morrison proposed at last week's meeting of the London County Council: "That it be an instruction to the Education Committee to consider and report whether, in the interests of economy, health, and convenience, electricity should be substituted for gas in schools where gas is already installed." Mrs. Wilton Phipps saw no objection to accepting the instruction. The Building Sub-Committee of the Education Committee had always considered the question of the substitution of electricity for gas. It merely expressed the usual practice. The reference to the Committee was accepted.

Streets in Darkness.—Intimation was made at a meeting of New Ross (Wexford) Urban Council that certain ratepayers had instructed a solicitor to apply for a mandamus if steps were not taken at once for public lighting. The town is in darkness because of the Council's non-acceptance of the Gas Company's tender, which they had considered too high. The obligation of the Council in the matter was emphasized, and the danger of continued non-lighting was also dwelt upon. The Chairman (Mr. T. Redmond) said there was no opposition to the Gas Company, and they could charge what they liked. It was resolved to ask the Company if they were prepared to make a reduction in their tender.

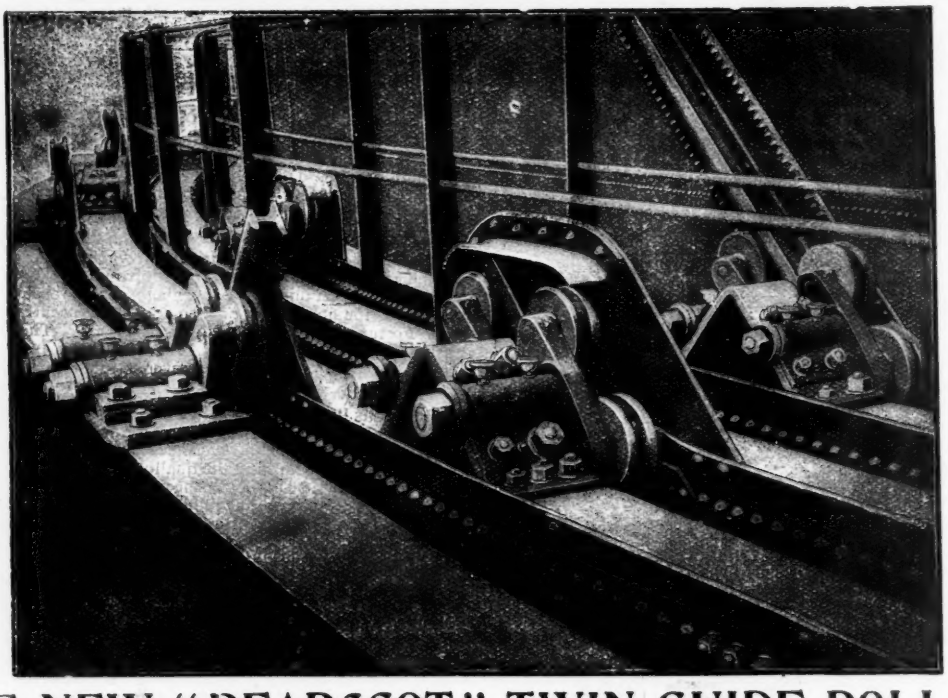
Cheaper Gas at Harwich.—From the September quarter meter readings, the Harwich Gas and Coke Company, Ltd., are reducing the price of gas 1d. per therm. This is the second reduction of 1d. per therm during the current year, and is equivalent to a total reduction of 9d. per 1000 c.ft.

Kilkenny Gas-Works.—A suggestion is being discussed in Kilkenny as to whether the time has not come for the erection of new gas-works in the city. The existing works are held to be inadequate to up-to-date requirements, and the quality of the gas supplied is much discussed; while the public lighting system is also severely criticized.

Bradford and the Tong Overseers.—The rating dispute between the Bradford Corporation and the Overseers of Tong (an out-district of the city), based on a disagreement as to preferential rating to which Tong has been entitled since incorporation because of the difference in the price of gas, has been settled by the Overseers and ratepayers giving way. They claimed that the Corporation were asking too much, even though much less than in other parts of the city, because the price of gas in Tong rural area—by a private company—is still higher than that for Bradford Corporation gas. They have given way on the advice of their own legal advisers.

Cirencester Gas Company, Ltd.—The Directors stated in the annual report, which was adopted at the recent meeting, that the revenue account showed a profit for the year ended June 30 of £2233, as against a loss for the previous twelve months of £809. An interim dividend at the rates of 4, 2, and £2 16s. p.ct. on the several classes of shares had been paid, and the Board recommended a final dividend at the same rate, and also the transfer of £500 from profit and loss to the contingency account. A slight falling off in the consumption of gas was attributed partially to the increase in price charged during the early part of the year. In the course of the year, however, the price was reduced 1s. 6d. per 1000 c.ft. Mr. Henry Tovey (the Vice-Chairman), whose death was announced with regret, was associated with the Company for a long period, and for 37 years had been a Director.

Gas-Meter (Fees) Order, 1922.—Attention is drawn by the Public Control Committee of the London County Council to the fact that, as already recorded in the "Journal," the Board of Trade have issued a new Order, dated June 2 last, known as the Gas-Meter (Fees) Order, 1922. The Order is issued so as to make clear the position with regard to meters tested *in situ*. The Sale of Gas Act, 1859, provided for double the ordinary testing fee to be charged in cases in which a meter was tested *in situ*. Under the Gas-Meter (Fees) Order of Nov. 3, 1920, and the Gas-Meter Regulations, 1920, it was intended that in future the ordinary single fee should be payable, *plus* a charge by the inspector for reasonable expenses. This view was, however, challenged by a Government Auditor, who held that the section in the Act of 1859 was still operative. The new Order, which revokes the Order of November, 1920, makes it clear that the new scale of fees is to apply equally to meters tested *in situ*, as was intended in the Order and Regulations of 1920.



THE NEW "BEARSCOT" TWIN GUIDE ROLLERS

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MANCHESTER.

STOCK MARKET REPORT.

THE Stock Exchange has had a rather mixed week, according as conflicting tendencies ruled. The first two days were quiet with a fairly firm tone. Then weakness supervened, arising less from Home affairs than from the weakness of foreign exchanges. But a brighter state of things was restored before the close, when the fall of the Lloyd George Government became a *fait accompli*. Home Government issues improved; the big four marking on Friday thus: Consols 57⅛-57⅜, War Loan 100⅝-101¼, Funding 85⅛-85¼, Victory 88⅛-88⅜. Indian and Colonial showed little change. Home Rails were dull on the whole; but Canadians and Argentines showed strength.

The Foreign Market had a poor time for the most part; but French, Turkish, Brazilian, and Chinese made something of a rally at last. Rubbers were in good form; but Oil was dull.

Business in the Gas Market made a much better show in point of activity as compared with the week before; but again Gas Light and Coke monopolized the lion's share of it. Some of the less known issues, however, were in evidence. The prevailing tone was quite good, and most of the variations in quotation were in the upward direction. In the London Companies, South Metropolitan rose 1; but Gas Light ordinary fell 1. In the Suburban and Provincial group, Hastings and St. Leonards 3½ p.ct. rose 2, Newcastle 3¼, Southampton 2, and Tottenham "B" 1. Bombay touched par *cum. div.* Europeans were firm, and Imperial Continentals steady.

The following transactions in gas during the week were recorded: On Monday, Bombay 96s. 10½d., Commercial 3½ p.ct. 94⅜, Gas Light ordinary 96⅜, 96⅞, 97, 97⅛, 97⅜, 97½, 97⅜, 97⅞, 98, ditto maximum 62, 62¼, 62½, ditto debenture 61, 62, Imperial Continental 159, 159½, Primitiva preference 34s. 9d., ditto 1911 debenture 55, 55⅛, South Metropolitan 94⅛, 94⅜, 94½, 95, Wandsworth-Wimbledon 99, Brentford 7½ p.ct. mortgage 103⅛, 103⅞, Folkestone 63, 63⅜. On Tuesday, Brentford "B" 101, European 10⅞, 10⅜, Gas Light ordinary 96⅜, 96½, 96⅝, 97, 97⅛, 97⅜, 97½, ditto maximum 62, 62⅜, ditto preference 76⅛, 77, ditto debenture 61⅛, 62⅛, Imperial Continental 158, Lea Bridge 99, 100, 100⅛, Primitiva 11s. 6d., ditto preference 33s. 6d., 35s., South Metropolitan 94⅛, 94¾, 95⅛, ditto 6½ p.ct. debenture 104⅛, South Suburban 97⅛, Wandsworth New 90, ditto Wimbledon 98, Danish 4 p.ct. debenture 65. On Wednesday, Bombay 99s., 100s., Brentford "B" 102, Commercial 3½ p.ct. 95, Continental Union preference 52¼, European 10⅜, 11⅛, Gas Light ordinary 96⅛, 96⅜, 96⅝, 96⅞, 97, 97⅛, 97⅜, 97½, ditto preference, 77, 77⅜, ditto debenture 62, Imperial Continental 158, 160, Primitiva 12s. 3d., ditto preference 34s. 1½d., 34s. 9d., ditto 4 p.ct. debenture 68, South Metropolitan 95, 95⅜, ditto 6½ p.ct. debenture 104½, Southampton 80 5/16, 80⅞, Tottenham "B" 100, 100½, Croydon 7 p.ct. preference 101½, 102½, Newcastle 3½ p.ct. debenture 75½, Swansea 7 p.ct. preference 103¾. On Thursday, Alliance and Dublin 65, Brentford "B" 101, Chester 77½, European 11⅛, Gas Light ordinary 95⅞, 96, 96⅛, 96⅜, ditto maximum 62½, 62⅝, 63, ditto debenture 61, Imperial Continental 158, 160, Newcastle 76, 78, 78½, Primitiva 11s. 9d., ditto preference 33s. 9d., 35s., 36s., South Metropolitan 95, 95½, ditto 6½ p.ct. debenture 105⅝, Tynemouth 75. On Friday, Alliance and Dublin 65½, 65⅝, Brentford "B" 102½, Bristol 90⅜, Chester 77½, Commercial 4 p.ct. 95, European 10⅜, 11⅛, Gas Light ordinary 95⅛, 95⅞, 96, 96⅛, 96⅜, Imperial Continental 158, Primitiva preference 35s. 6d., South Metropolitan 95⅛, 95⅜, Tottenham "B" 99½, Swansea 7 p.ct. preference 103½.

In the Money Market, there was again some degree of fluctuation, rates in the earlier half of the week being quite comfortable; but in mid-week the position hardened materially. This in its turn gave way, and the close was easy. Discount continued firm to the end. Silver was subjected to some heavy selling, which pulled down the price considerably; 33⅜d. being the mark at the close. The Bank of England rate was 3 p.ct., as fixed on July 13.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S TRANSACTIONS.

Issue.	Share.	When ex-Dividend.	Ante-War Dividend & Bonus.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Transactions.
£			p.c.					
182,049	Stk.	Aug. 24	4	4%	Aldershot 4 p.c. Pref.	..	68—73	...
1,551,868	,,	Oct. 5	2½	5%	Alliance & Dublin Ord.	59—64	62—67	65—65½
374,000	,,	July 13	4	4%	Do. 4 p.c. Deb.	76—79	60—65	...
280,000	5	Oct. 19	7½	4/–	Bombay, Ltd.	5⅞—6⅛	4¼—5*	96/10½—100/–
100,000	5	Aug. 10	16	7½%	Bournemouth Gas and Water: 5 p.c.	..	11—12	...
383,110	10	,,	7	7%	Bournemouth Gas and Water: B 7 p.c.	15—15⅛	10½—11½	...
115,000	10	,,	6	6%	Bournemouth Gas and Water: Pref. 6 p.c.	13½—14	8—9	...
162,065	—	June 29	—	4%	Bournemouth Gas and Water: 4 p.c. Deb.	..	73—78	...
992,045	Stk.	July 27	14	6/–	Brentford A Consolid.	261—266	98—103	...
734,920	,,	,,	11	6/3	Do. B New	204—209	98—103	101—102½
55,000	,,	,,	5	5%	Do. 5 p.c. Pref.	109—111	82—87	...
221,400	,,	June 15	4	4%	Do. 4 p.c. Deb.	91—93	75—80	...
214,775	,,	Aug. 24	11	11%	Brighton & Hove Orig.	208—213	165—170	...
244,200	,,	,,	8	8½%	Do. A Ord. Stk.	154—159	120—125	...
1,287,500	Stk.	July 28	5	5%	Bristol 5 p.c. max.	..	..	90½
530,000	20	Oct. 5	12½	22/6	British	44—45	30—32	...
120,000	Stk.	June 29	4	4%	Do. 4 p.c. Deb. Stk.	88—90	75—80	...
245,771	,,	,,	4	4%	Buenos Aires 4 p.c. Deb.	85—87	53—58	...
100,000	10	June 1	—	7%	Cape Town & Dis., Ltd.	1½—2½	6½—7½	...
100,000	10	Oct. 19	—	4½%	Do. 4½ p.c. Pref.	4—6	6—7*	...
100,000	Stk.	June 29	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	73—78	...
157,150	,,	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	77½
1,513,280	,,	July 27	5/9/4	56/–	Commercial 4 p.c. Stk.	106—108	93—98	95
560,000	,,	,,	5½	55/–	Do. 3½ p.c. do.	103—105	93—98	94½—95
475,000	,,	June 15	3	3%	Do. 3 p.c. Deb. Stk.	69½—71½	55—60	...
800,000	,,	Dec. 15	4	—	Continental Union, Ltd.	76—79	29—34	...
200,000	,,	,,	7	—	Do. 7 p.c. Pref.	115—118	50—55	52½
660,000		Sept. 1	—	6%	Croydon sliding scale.	..	85—89	...
284,975		,,	—	5%	Do. max. div.	..	78—82	...
492,270	Stk.	—	6	4½%	Derby Con. Stk.	123—125	..	...
55,000	,,	—	4	4%	Do. Deb. Stk.	102—104	..	...
1,002,180	10	July 13	10	5/0	European, Ltd.	17⅛—18	10½—11½	10½—11½
16,298,975	Stk.	July 27	4/17/4	52/–	Gas Light and Coke: 4 p.c. Ord.	98—102	95—97	93½—98
2,600,000	,,	,,	3½	35/–	Gas Light and Coke: 3½ p.c. max.	76—79	61—64	62—63
4,062,235	,,	,,	4	4%	Gas Light and Coke: 4 p.c. Con. Pref.	96—99	76—81	76½—77½
4,674,850	,,	June 15	3	3%	Gas Light and Coke: 3 p.c. Con. Deb.	72½—74½	61—64	61—62½
130,000	,,	Dec. 11	10	10%	Gas Light and Coke: 10 p.c. Bonds	..	..	...
82,500	,,	Sept. 21	5	65/7½	Hastings & St. L. 5 p.c.	..	95—100	...
258,740	,,	,,	3½	50/7½	Do. 3½ p.c.	87—89	77—80	...
70,000	10	May 18	11	7½%	Hongkong & China, Ltd.	16½—16¾	6—7	...
86,600	Stk.	Aug. 24	9	9½%	Hornsey 7 p.c.	..	127—132	...
1,976,000	,,	May 18	9	10%	Imperial Continental	150—160	156—162	158—160
404,800	,,	Aug. 10	3½	3½%	Do. 3½ p.c. Deb. Red.	84—86	70—75	...
235,242	,,	July 27	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	95—100	99—100½
2,498,905	,,	Feb. 26	10	37/6	Liverpool 5 p.c. Ord. A.	211—213	..	...
					Liverpool 5 p.c. Ord. B.	146—148	..	...
306,083	,,	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	...
165,736	,,	Aug. 10	7/5/6	87/3	Maidstone 5 p.c.	..	87—92	...
63,480	,,	June 29	—	3%	Do. 3 p.c. Deb	..	54—59	...
75,000	5	,,	6	6%	Malta & Mediterranean	4⅛—4½	3⅛—3½	...
250,000	100	Oct. 2	4½	4½%	Met. of Melbourne 4½ p.c. Deb.	99—101	89—96	...
541,920	Stk.	June 1	4	4%	Monte Video, Ltd.	11½—12	62—67	...
1,875,892	,,	July 27	4½	4½%	Newcastle & Gatsh'dCon.	98½—99½	78—79	76—78½
529,705	,,	June 29	3½	3½%	Do. 3½ p.c. Deb.	82—83	67—68	...
15,000	10	Aug. 26	—	7/6	North Middlesex 10 p.c.	..	12⅛—13	...
55,940	10	Aug. 24	7/14/0	7/8⅝	,, ,, 7 p.c.	14—15	10⅝—11⅛	...
300,000	Stk.	May 18	8	8%	Oriental, Ltd.	117—122	92—97	...
60,000	5	—	10	—	Ottoman, Ltd.	7½—7¾	2—3	...
188,120	Stk.	June 29	—	6/3/9%	Plym'th & Stonh'se 5 p.c.	..	93—98	...
60,000	50	Aug. 24	13	65/–	Portsea Island, B	128—131	100—105	...
100,000	50	,,	12	60/–	Do. C	118—121	85—90	...
249,980	5	—	8	—	Primitiva Ord.	5⅛—6	1 1/16—1 3/16	11/6—12/3
499,960	5	—	5	—	Do. 5 p.c. Pref.	4⅝—5	1⅛—1⅜	33/6—36/–
521,600	100	June 1	4	4%	Do. 4 p.c. Deb.	91—93	68—73	68
600,000	Stk.	July 27	4	4%	Do. ,, ,, 1911	..	55—60	55—55½
346,198	,,	June 29	4	4%	River Plate 4 p.c. Deb.	85—87	53—58	...
150,000	10	Sept. 21	6	6/–	San Paulo 6 p.c. Pref.	10⅝—11	5⅜—6	...
125,000	50	July 3	5	5%	San Paulo 5 p.c. Deb.	47—49	35—38	...
135,000	Stk.	Aug. 24	10	5%	Sheffield A	223—224	96—98	...
209,984	,,	,,	10	5%	Do. B	222—224	96—98	...
523,500	,,	,,	10	5%	Do. C	220—222	96—98	...
133,201	Stk.	Sept. 15	4	4%	Shrewsbury 5 p.c.	..	..	...
90,000	10	June 29	9	7½%	South African	10½—11½	7—9	...
6,609,895	Stk.	July 27	5/4/0	5%	South Met. Ord.	111—113	94—97	94½—95⅛
350,000	,,	July 13	—	5%	Do. Red. Pref.	..	94—96	...
1,895,445	,,	,,	3	3%	Do. 3 p.c. Deb.	72½—74½	61—64	...
224,820	,,	Aug. 24	8½	8½%	South Shields Con. Stk.	157—159	106—108	...
1,087,795	,,	,,	6	6%	S'th Suburb'n Ord. 5 p.c.	114—116	97—100	97½
368,837	,,	June 15	5	5%	Do. 5 p.c. Deb. Stk.	116—118	95—100	...
647,740	,,	May 18	5	5%	Southampton Ord.	99—102	77—82	80 5/16—80⅞
121,275	,,	June 29	4	4%	Do. 4 p.c. Deb. Stk.	..	63—68	...
120,000	,,	July 27	—	7½%	Tottenham A 5 p.c.	135—138	112—117	...
782,275	,,	,,	6	6%	Tottenham B 3½ p.c.	115—117	98—103	99½—100½
181,255	,,	June 15	4	4%	District 4 p.c. Deb.	87—89	75—80	...
182,380	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	⅛—¼	...
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	20—30	...
236,476	Stk.	Aug. 24	5	2½%	Tynemouth 5 p.c. max.	108½—109	73—75	75
					Wandsworth, Wimbledon, and Epsom—			
30,000	,,	July 27	8½	72/6	Wandsworth A 5 p.c.	151—156	111—115	...
235,636	,,	,,	6½	57/6	Do. B 3½ p.c.	129—134	95—100	...
108,075	,,	,,	—	50/9	Do. C.	..	87—92	...
140,865	,,	,,	—	50/9	New Ordinary	..	87—92	90
352,000	,,	,,	6½	53/9	Wimbledon 5 p.c.	117—122	95—100	98—99
98,000	,,	,,	6½	58/9	Epsom 5 p.c.	121—126	95—100	...
88,416	,,	June 29	3	3%	3 p.c Deb. Stk.	66—69	57—60	...

* Ex Div.

STOCK ISSUE.

By Order of the Directors.

NEW ISSUE OF ORDINARY AND DEBENTURE CAPITAL.

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TRADE NOTES.

A Reinforced Concrete Purifier-House.

We understand that Messrs. W. C. Holmes & Co., Ltd. of Huddersfield, have received the order for the extension of purifiers for the Tunbridge Wells Gas Company. The purifier-house is being constructed in reinforced concrete, which is also being used for the reconstruction of flooring in the existing building. The concrete work is being carried out by the F.C. Construction Company, Ltd., of No. 26, Irongate, Derby, who are acting as sub-contractors to Messrs. W. C. Holmes & Co., Ltd.

Fletcher Gas-Grates.

A new Gas-Grate List, No. 269, which is being issued by Messrs. Fletcher, Russell, & Co., Ltd., of Warrington, gives illustrated particulars of their many well-known and popular series of fires, as well as of the 1922-23 season "Historic" gas-grates (Radiation standard pattern). The "Historic" series embody all the latest improvements, including the patent adjustable fuel nozzle, which facilitates fixing in front of coal-grates with low canopies. All parts except the front casting are interchangeable with the corresponding sizes in the series, and also with those of the other Companies associated with Radiation, Ltd.

The "Efficient" Series of Burners.

In a preliminary list just issued by Burners (1921), Ltd., of Stoke Prior Mills, Bromsgrove, particulars are given of their "Efficiency" burners. The Company claim that this is the only range of burners completely standardized and having all parts interchangeable. The range comprises preheated, shell, and other types of burners, as well as 300 c.p. indoor and outdoor lamps; while the "Therm" minor burner (with a consumption of 1 c.ft. per hour) meets the case where only a small light is necessary. Special attention is called by the Company to the following points in connection with the manufacture of their appliances, which are British made throughout: New screw collar air adjustment, allowing of a very minute adjustment, and tending to a noiseless burner; no tube is used in the manufacture of the burners, all parts being cut from solid metal; the regulators are standardized throughout; all threads are standard brass sizes; aluminium burners, each size being made for either flanged or lugged "Vitreosil" or glass globes; the nozzle holders are interchangeable, and suit bijou, No. 2, medium, or universal nozzles; all parts are entirely standardized and interchangeable.

Oswaldtwistle Gas Managership.—The resignation of Mr. J. H. Davies, Gas Manager at Oswaldtwistle, was discussed by the Urban District Council last week. Mr. C. W. Welton asked if the resignation [*ante*, p. 109] had been reconsidered. Mr. T. Usher (the Chairman of the Gas Committee) said he was sorry not to be able to report a definite promise from Mr. Davies to withdraw his resignation. The subject came up on a notice of motion by Mr. Welton, "That the salary of the Gas Engineer be reduced to £700 per annum as and from Dec. 1 next." Mr. Welton said that, in view of the fact that Mr. Davies's resignation was still under consideration, he did not think it politic to move his resolution at that time.

The Cape Town and District Gas Light and Coke Company announce a dividend of 7 p.ct. per annum, less tax, on the ordinary shares for the past half year.

Messrs. Oxide, Ltd., of Brentford, Middlesex, regret to announce the death, suddenly, on the 13th inst., of Mr. Charles E. Fry, at his residence, Norman Road, Hove. The business is being carried on by Mr. B. Clement Fry, to whom all inquiries should be sent.

At St. Annes, Councillor J. Watts explained how the purchase of the gas undertaking was effected. He pointed out that the cost would be £80,000, of which £50,000 was represented in meters, cookers, and mains. By the establishment of a new works, the town would be well supplied with gas at a greatly reduced rate.

The Directors of the South African Lighting Association, Ltd., have resolved to pay on the 27th inst., to shareholders registered in the books on the 29th ult., an interim dividend of 3½ p.ct. (7 p.ct. per annum), less income-tax at 4s. 3d. in the pound. This dividend compares with one of 3 p.ct. (6 p.ct. per annum) paid a year ago.

A recent electricity breakdown at Barrow plunged in darkness all the places dependent on electric lighting. When the fault occurred at the Corporation electricity works, a supply of current was secured from the private installation of Messrs. Vickers, but this also failed. Those premises which had gas naturally scored a great advantage.

An issue by tender of £1197 £5 6 p.ct. redeemable preference shares in the Haslemere and District Gas Company is announced by Messrs. A. & W. Richards, of 37, Walbrook, E.C., who ask that tenders should be forwarded to them not later than 11 o'clock to-morrow (Thursday). The minimum price of issue is £4 17s. per share; and they are to be redeemed at par on March 31, 1930. The output of gas has more than doubled in the last ten years, and steadily increases.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

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Continued on p. 252.